EU Transition and Economic Prospects for Large and Medium Sized Firms in Wales

Report

For:

Welsh Government

18th August 2017

WELSH ECONOMY RESEARCH UNIT
Yr Uned Ymchwil i Economi Cymru

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

Cardiff Business School
Ysgol Busnes Caerdydd

Table of Contents

This report was written by Calvin Jones, Max Munday, Annette Roberts and Meng Song at the Welsh Economy Research Unit of Cardiff Business School. The authors are grateful for the support provided by a number of large and medium sized firms in Wales by way of consultation responses. Moreover, Welsh Government staff led on the direct consultation process with businesses and the authors are grateful for the support of Audrey Johns, Ruth Bacigalupo, and Emma Watkins in this respect.

The authors are grateful for the assistance of a large number of Welsh firms in assisting with the research for this report. The views expressed in this report are based on the authors' analysis of company feedback and do not necessarily express the views of those companies contacted in the process of the research.

Summary

Research objectives

The Welsh Economy Research Unit of Cardiff Business School was commissioned by the Welsh Government during May 2017 to undertake research that would inform:

- Welsh Ministers such that they will better understand business concerns and actions surrounding EU transition.
- The Welsh Government's response and discussions with the UK Government surrounding the EU transition negotiations.

The research was conducted largely through the lens of the Welsh Anchor and Regionally Important Companies (RICs), and addressed questions including:

- How post Brexit options would affect large and medium sized firms in Wales, and which sectors could be most vulnerable to the EU transition process?
- What might EU transition processes mean for inward investment and trade in sectors?
- What would a change in investment levels or output mean for other parts of the regional economy (i.e. supply chain and household effects)?

In achieving these objectives the main strands of work comprised a review of previous research; an analysis of recent statistical data on Welsh trade and inward investment, and a consultation process with selected large and medium sized companies in Wales. In the research the focus was on a series of components of risk that faced selected sectors. The risk components considered included:

- The expected effects of tariffs on export trade directly and indirectly.
- The effects of tariffs on firm inputs.
- The effects of non-tariff barriers on sector trade and activity.
- Labour market risks focusing on dependence on EU staffs, or how different sectors might face cost/skills pressures resulting from inability to use EU staffs.
- The effects on the Welsh economy of changes in sector activity.

- Effects linked to loss/reduced access to EU networks and institutions.
- Risk associated with sector susceptibility to investment cycles: recognizing that firms and sectors with older assets, or with goods and services that are mature or coming to the end of their life cycle, might be particularly vulnerable during and post the EU transition process.
- Sector firms positioning in corporate network and corporate options to displace regional activity, this recognizing the extent to which the operations in Welsh firms are undertaken elsewhere, and also with corporate options to relocate activity connected to issues including the uniqueness of Welsh assets, sunk costs, and the value added of regional operations.

Using the findings from the research review, the data analysis, and the consultation process, the risks were assessed for 16 defined sectors.

Themes from the firm consultation

An overall appraisal of the individual firm responses to the consultation process revealed evidence that Brexit and the process of transition was already being factored into business decisions with economic ramifications for Wales. A persistent theme in responses was current uncertainty. Manufacturers gave examples of how they were currently in negotiations with parent organisations for investment for new product lines or new contracts, and that the impacts of future potential duties was a consideration in such decisions.

The consultation also revealed that the key issues facing firms were in fact very diverse. These ranged from issues on future tax reliefs, specific regulations, access to specific goods and services, tariff levels etc. Respondents more concerned about tariffs and free movement of labour/staff corresponded with those where labour productivity is relatively high (i.e. Other advanced manufacturing, Aerospace, Automotive). Very few of the respondents saw Welsh operations as fully immune from EU transition processes and underlying uncertainty. However, the most vulnerable to EU transition processes and resulting uncertainty are operations in Wales that are less embedded and more akin to 'branch plants.' Finally, few respondents were able to comment on any new opportunities presenting themselves as a result, for example, of a hard Brexit and trading on WTO rules.

Sector risks

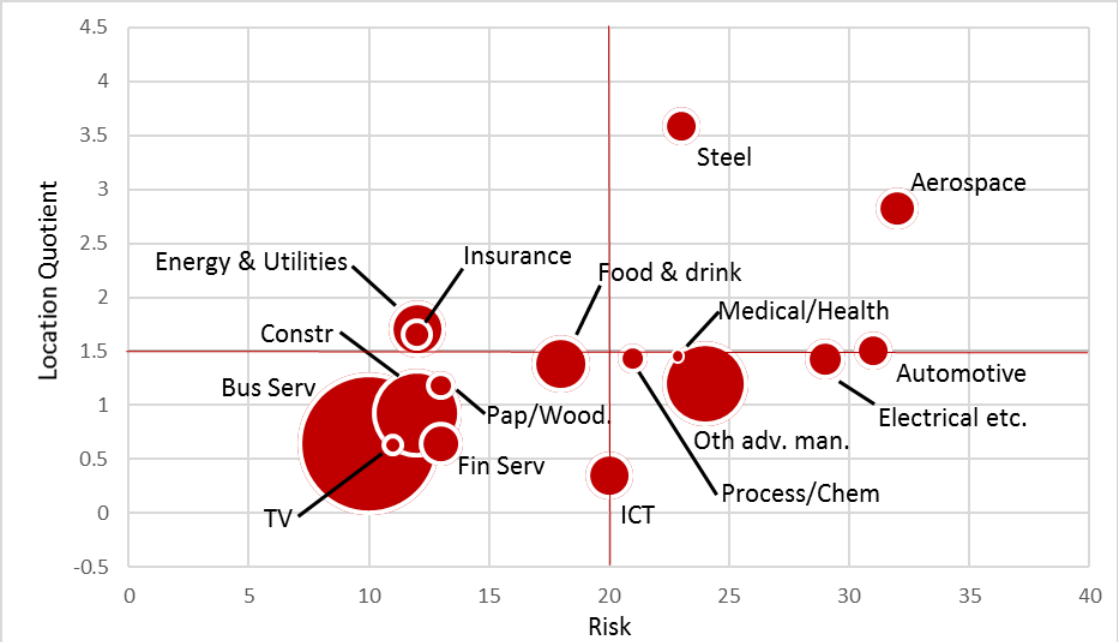
The report revealed a number of key themes and areas which will be useful in considering the impact of Brexit on Wales' larger firms; their potential responses; and in developing reactive policies. Notably, respondents in sectors that are non-EU oriented (in terms of inputs and markets), and with place-embedded production, see Brexit as a *relatively* minor problem. Sectors here include Construction and civil engineering, Paper and wood, Business services and TV production. Even here of course there is the prospect of impact should the UK economy overall experience slower growth as a result of Brexit.

Table: Summary of how sectors were rated on different aspects of risk

	Effects of tariffs on sector export trade directly and indirectly	Effects of tariffs on inputs	Effects of non-tariff barriers on trade and activity	Labour market risks	Effects in regional economy of changes in activity of firms	Effects linked to loss of access to EU knowledge and innovation networks and frameworks	Current age and structure of assets in Wales, susceptibility to corporate investment cycles	Positioning in corporate networks, embeddedness and likely options to displace Welsh activity
Aerospace systems and services	Medium/High	Medium	High	Medium	High	High	Medium/High	Medium
Automotive, transportation and related	High	High	Medium	Low	High	Medium	High	Medium-High
Business services	Low	Low	Low	Low	Low-Medium	Low	Low	Low-Medium
Construction and civil engineering	Low	Low	Low	Low-Medium	Medium/High	Low	Low	Low
Elec. Eng.components, semiconductors	High	High	Medium	Low	Medium/High	Medium	Medium-High	Medium-High
Energy & utilities	Low	Low	Low	Low	High	Low	Low	Low
Financial services	Low	Low	Low	Low	High	Low	Low	Low-Medium
Food and drink	Medium	Medium	Low	Medium	High	Low	Low	Low
Information and communications technology	Medium	Low	Low-Medium	Medium	Low-Medium	High	Low-Medium	Low-Medium
Insurance	Low	Low	Low	Low	Medium/High	Low	Low	Low-Medium
Medical/health products and services	Low-Medium	Medium/High	Medium	Low	Medium	High	Low-Medium	Medium
Other adv. manufacturing and engineering	Medium-High	Medium	Medium	Low	Low-Medium	Low-Medium	High	Medium-High
Paper, wood, wood products	Low	Low	Low	Low	Medium	Low	Medium	Low-Medium
Process and chemicals	High	Low	Medium	Low	Medium/High	Low	Medium-High	Low-Medium
Steel	High	Low	Medium	Low	High	Low	Medium-High	Medium
TV production and creative	Low	Low	Low	Low-Medium	Medium	Low	Low	Low

The table above summarises how different sectors were rated on the different categories of risk, while the Figure below provides some overall perspective on the significance of the risks for each sector, and the importance of the sectors to the Welsh economy by charting sector risk against that sectors employment location quotient (LQ). The LQ shows the relative importance of that sector in Wales compared to Great Britain. A LQ which is greater than 1 shows that that sector is relatively over-represented in Wales compared with GB. The solid lines in the Figure separate the sectors into above and below average risk, and into relatively high and lower LQs, such that sectors in the top right hand side of the figure are both above average risk and relatively significant (in employment terms) in Wales. A further dimension has been provided in the Figure to show the absolute size of each sector in Wales (using an employment measure) by varying the size of each data point.

Figure: Risk, Location Quotient and Sector Employment



How Brexit might affect Wales' largest firms

Larger firms in Wales cite a variety of mechanisms whereby Brexit may impact their business in Wales. To summarise:

- In a number of cases a hard Brexit resulting in **EU Tariff barriers**, in terms of inputs, final products or both, will reduce the competitiveness of Welsh products. In some cases (Automotive) even tariffs of 5-7% would impact local profitability. In other cases, Food and drink especially, tariff barriers may effectively reduce EU exports, at the same time as Welsh producers are exposed to lower cost global competition.
- Similarly, should the UK find itself outside Single Market and associated regulatory regime, there are a number of ways in which **non-Tariff barriers** may impact Welsh firms' cost, competitiveness and exports. These barriers vary widely between sectors. Firms in Medical/health products and Process and chemicals sectors, for example, would find themselves outside of longstanding EU approvals processes and other agreements that might imply border delays, and increased costs in duplicating such processes should they wish to continue to export to the EU. In other cases such barriers are more subtle; for example, for Aerospace systems and services and Other advanced manufacturing they may be related to the ability to participate in pan-European consortia and engage in defence procurement.

- There was generally a lower level of concern on **labour market impact** of Brexit. Where this was evident, it related to both the availability of un/low skilled workers (e.g. Food and drink) *and* the ability for highly skilled non-UK resident technical staff to travel and work within multinational plants in the UK (Aerospace systems and services; Other advanced manufacturing).

Company Responses to Brexit

Potential company responses to a (hard) Brexit were very varied, linked to firm-, sector- and plant-specific issues. In summary however;

- For a number of firms the prospect of Brexit resulting in **significant disinvestment** from Wales (and the UK) – and in some cases potentially complete exit – was a real one. The companies in this bracket tended to be multinationals with a large presence in Wales; a number of these in the Aerospace systems and services, Automotive, transportation etc., and Electrical engineering etc. sectors.
- This disinvestment would result from **intra-firm competition for investment** for plants with products at the end of the life cycle or where production could be easily shifted overseas. It should of course be noted that such competition can result in plant disinvestment irrespective of Brexit.
- Where firms had higher sunk costs, or were otherwise less mobile, it was envisaged that any Brexit-related loss of competitiveness would result in lower returns from EU exports.

Impacts on the Welsh Economy

Firms and sectors have differing levels of importance to the Welsh economy, based on their level of employment and pay, supply chain impacts and value adding activity. The research in this report suggests that this direct and indirect economic importance is particularly notable for Automotive, transportation etc. and Aerospace systems and services, which are well paying and high value-adding sectors, directly employing very high numbers and supporting high levels of employment and value-added across the rest of the Welsh economy.

Policy responses

In synthesizing the research undertaken for this report, primary, secondary and following economic modelling, there are a number of key findings having implications for regional economic impact and policy response:

- The plants in Wales most vulnerable to a 'hard' Brexit are typically **branch plants of multinationals with production options elsewhere in Europe**, where intra-firm investment is subject to rounds of internal competition, and where new products or investment decisions are imminent.
- A number of these firms are in the **Aerospace, Automotive and transportation, and Electrical engineering etc**. sectors and are amongst Wales' largest private sector employers, and have very significant indirect economic contributions.
- Firms in sectors such as **Steel, and Process and chemicals** may face similar pressures but in some cases have high levels of sunk costs in Wales which make disinvestment a medium-term prospect.

On balance, it appears that non-tariff barriers may be the most problematic for firms wishing to trade with the EU following a hard Brexit. However, tariff barriers (and related international competition) are not insignificant, and are especially worrisome for the Food and drink sector.

Recommendations from the research

A number of principles/issues might guide emergent regional policy as Brexit unfolds;

In most cases, focus on business themes, not sector

The heterogeneity of responses of firms within sectors – dependent on ownership, product and existing markets, suggest that a sector approach might not be an appropriate structure through which to target the policy response. Rather consideration needs to be given to firm characteristics as the response lens rather than the 'sector', however defined. There is a challenge to look far more closely at themes which unify groups of firms in terms of ownership, product cycle, and firm target markets, as opposed to any bundling of response by sector.

..although a holistic lens is sometimes required

Contrary to the above, it is probable that the competitiveness of the food and drink sector post-Brexit will be tied more closely to the nature and scale of the agricultural sector in Wales and the UK. Here, the historic split of policy between agriculture/land use and food processing (partially a result of EU funding structures) may be unhelpful, and a more holistic approach beneficial, particularly in terms of policy development and sectoral initiatives.

A focus on Anchors and RICs?

The analysis of firm level data on trade, local functions and vulnerability to tariff and non-tariff barriers in a post Brexit world might be seen to question how many of the current Anchor companies actually fulfil an anchor role in the economy. EU transition may result in a re-evaluation of the criteria used to select Anchor companies.

Sectors missing from the analysis

The analysis was undertaken with a sample of firms that are representative of some of Wales' most important sectors. There were some sectors less well covered, or that would benefit from further analysis including tourism facing sectors, and parts of the business and professional services sectors. There is also an argument for focusing research resources on those firms that are growing fast in Wales, or are in relatively faster growing market segments, but which are not currently large or medium sized firms. This could include more niche elements of advanced manufacturing and engineering, and firms in the environmental goods and services sectors. These firms may face different pressures during EU transition processes.

The big exporters?

Care should be taken in over-focusing on firms that appear to be large exporters. In some of the largest exporting sectors little value is actually added within Wales. In selected services (particularly business services, ICT) the value added in their exports might be relatively high. Future analysis might explore which of Wales' services sectors feature higher levels of value added in their exports. The Input-Output tables for Wales might be used as a start here to explore the issue but it is expected that this could be better achieved through a simple survey of a sample of firms in these Welsh sectors.

The scenarios

The consultations were focused on the consequences of a hard Brexit. Continued uncertainty matched with political reality in Westminster would suggest that the probability of 'softer Brexit' is now more likely. Future work might focus on specific considerations for firms under subtlety different Brexit scenarios, notwithstanding that many of the risk factors discussed in this report result from current uncertainty as much as expected differences in the final UK settlement.

Data improvements

While the situation with respect to economic data on Wales has improved there are still almost no data on how Wales trades with the rest of the UK, and through other regions then the rest of the world. The same is true of how Welsh firms use imports from various geographical sources. Developing datasets on intra UK trade might be resource intensive, but in understanding how external shocks might affect the Welsh economy such information is important.

Non-tariff barriers

In both the consultations and review the report shows that non-tariff barriers are of concern for Welsh firms. It is in assisting firms to respond and understand the scale of the challenge with respect to non-tariff barriers that Welsh Government could make an advantageous intervention. A recommendation would be a more thorough review of the non-tariff barriers that will face Welsh businesses and then, following a structured consultation with large and medium sized firms, the development of targeted information to assist firms appreciate the scale of the challenge, and possible responses.

Inward investment marketing

Welsh Government will need to look carefully at the spatial distribution of location marketing resources. The EU transition process is already impacting flows of inward investment to Wales, and trade relations will change. In planning future overseas representation Welsh Government must consider how Brexit will affect these trade and inward investment decisions and build this into future overseas marketing decisions. Much of the inward investment 'boom' that occurred in Wales during the 1980s and 1990s was driven by access to the EU market.

It is some of the large inward investors that came to Wales during that period, particularly those which are focused almost wholly on production which now look particularly vulnerable.

Other issues for response

In forming policy responses the research in this report also leads to some further points:

- Leveraging tacit knowledge from selected large and medium sized firms will be critical. Among the firms consulted for this report some had much wider experience of working in markets outside of the EU, and in developing markets. Firms might be persuaded to share experience with non-rival firms and networks in Wales. There have been prior programmes in Wales which have encouraged firms to share innovative management and technical practice (Industrial Leadership Programme) and this format could be followed to share experience on international trading.
- Any labour market interventions must be narrowly targeted. The consultations showed that labour market issues were specific to a few sectors, rather than more widespread through those firms which were consulted in this report.

A context for the report was issues that Welsh Government should highlight in representations to UK Government as the process of EU transition develops. The report reveals that parts of the Welsh economy are at particular risk from a hard Brexit. In Welsh manufacturing there are large numbers of branch plants. While inward investment has been important in transforming economic prospects in some parts of Wales, some elements of the inward investment base are now vulnerable. This is particularly the case in operations where there are similar production plants within the multinational group elsewhere in the EU, where plants are engaged in contract manufacturing, or where product life cycles are mature and new investment is required at Welsh plants in the short term to continue operations.

At the very least EU transition has made these facilities more vulnerable. Then a critical point is Wales' strong reliance on inward investment, and a reduction in the existing stock, and reduced inward flows would have marked regional economic effects. Indeed a sustained reduction in inward investment flows would probably work to widen the economic disparity between Wales and the UK in term of indicators such as gross value added per head. Then while resources are focused on trade and exit negotiations additional resources at UK level need to be placed into the location marketing effort, and showing that the regions are very much open to business.

1 Introduction

1.1 Aim

The Welsh Economy Research Unit of Cardiff Business School was commissioned by the Welsh Government during May 2017 to undertake research that would inform:

- Welsh Ministers such that they will better understand business concerns and actions surrounding EU transition.
- The Welsh Government's response and discussions with the UK Government surrounding the EU transition negotiations.

The research was conducted chiefly through the lens of the Welsh Anchor and Regionally Important Companies (RICs).[1] This necessarily restricts the sectors that are examined in the report with Anchors and RICs not represented in sectors such as Tourism. In addition, the report does not include analysis of the agricultural and fisheries sector in Wales (except in broad terms, or in the context of the Food and drink sector, which is included). The issues relating to agriculture and fisheries are different to those facing the larger Welsh firms, and are beyond the scope of this report.

1.2 Context

The main context for the research is the UK decision to exit the European Union following the Referendum in June 2016. However, in undertaking the research there were a series of contextual issues which were considered in developing the more detailed objectives for the research process (see below; some of these issues are elucidated further later in the report). Critical among these were the following points:

[1] An anchor company is considered as a company which is a global or international organization and has either a Welsh headquarters function or a significant corporate presence in Wales. A regionally important company is considered as a company which is economically important to Wales.

- The forthcoming EU transition process has inevitably focused attention on Welsh business linkages to the EU economy through imports and exports. It is certainly true that many of the large and medium sized firms in Wales do sell directly to EU markets and import goods and services from these same markets. However, there is a very significant amount of Welsh trade to domestically and foreign owned firms in other parts of the UK, who subsequently sell on into and buy from EU markets. In considering how Welsh business might be impacted by EU transition, one key factor then relates to prospects for UK firms with whom Welsh firms trade. Unfortunately, intra-regional UK trade is an area where there are limited statistics available and very little is known. It was therefore necessary to directly consult with firms to understand how they traded with other UK firms.
- Wales hosts significant amounts of foreign inward investment. There have been valid concerns raised about how EU transition will affect prospects for marketing Wales as a location for inward investment. However, it is also necessary to consider impacts on foreign inward investors that are already operating in Wales. These foreign firms make up a significant proportion of large firm stock, and typically offer relatively high-wage employment. Some of these firms are also Wales' largest exporters. The post-Brexit trade landscape could affect new intra-firm investment levels in Welsh plants. Moreover, in a 'hard' Brexit these firms would be subjected to stronger competition in EU (and potentially other) markets from firms outside of the EU. These same firms might, however, benefit from weaker sterling, making exports more cost competitive in the EU/elsewhere. There has been much interest in how large multinational employers in Wales such as Airbus, GE, Tata Steel, and Ford will react to the post Brexit environment. However, several of the large inward investors in Wales had already experienced economic problems prior to the Brexit vote such that isolating the effects of Brexit on firm operations would be problematic.
- At the time of writing (July 2017) there is a great deal of uncertainty on the negotiating stance that will be taken by the UK Government. Business concerns have focused around the consequences of a 'hard' Brexit (outside the EU Customs Union and the Single Market) style agreement which would leave the UK with freedom to develop its own trade deals. It is not the purpose of this report to provide details of the various transition scenarios (see CBI, 2017[2] for an in depth consideration of the

[2] See https://www.cliffordchance.com/briefings/2017/02/the-future-of-trade-for-the-uk.html

different types of exit that could occur). However, under a hard Brexit scenario most likely is (providing no temporary interim agreements can be developed) a return to World Trade Organisation (WTO) 'rules' and the 'most favoured nation' principle. This essentially means that the EU could not offer the UK any more favorable treatment than its other trading partners. The prominence of the hard Brexit 'WTO' scenario has led to a focus on goods expected to attract high levels of tariffs in trade with the EU. However in addition to tariff barriers (perhaps 5-7% for many goods exported directly or indirectly to the EU, but with tariffs even higher on selected food and agricultural products), potentially more serious would be the effect of non-tariff barriers embracing regulatory standards, rules of origin, intellectual property rights, and in some cases basic market access restrictions. In consequence, in developing the more detailed objectives of the study it was necessary to consider expected effects of both tariff and non-tariff barriers, and business' understanding of the risks involved.

- Coverage in the press and in various consulting reports has been overwhelmingly negative in respect of the impacts of EU transition on UK business and economy. However, for Welsh Ministers in forming a response, it is also necessary to consider whether different EU transition scenarios might result in positive consequences for large and medium sized Welsh firms, or indeed whether there are industries in Wales which might be less affected by EU exit.
- Selected EU transition scenarios have labour market implications. Indeed there is already some evidence of a regional labour market response to Brexit fears. EU transition could lead to changes in labour mobility, and restrict Welsh firms from employing EU citizens. Once again, some large and medium sized Welsh firms make more extensive use of (non-UK resident) EU citizens than others.
- Much of any impact of EU transition on the Welsh economy (and its firms) will come via UK economy-wide effects from a change in investment and/or consumer and business confidence. However, there is the possibility that because Wales (compared to England) has a higher proportion of manufacturing employment in total employment, that the region might be more affected by a hard Brexit scenario.
- Due to time constraints, the primary consultations undertaken for this report were focused on a sample of Anchors and RICs. In some sectors where EU transition is

expected to have effects such as Tourism, there is no Anchor or RICs representation. It was also not the intention here to generalise expected effects from larger firms to the Welsh population of firms. For example, small and medium sized enterprises might face very different challenges, and this is being addressed through the collection of information from other organisations in Wales. Moreover, the Anchors and RICs are quite heavily concentrated in Industrial South Wales and North East Wales. There is some prospect that both 'positive' and 'negative' effects of Brexit will not be spatially even across Wales. Some commentators have argued that the rural economy could be particularly badly affected. Early indications are that the UK Treasury could assist agriculture in Wales for loss of direct subsidies on the removal of the CAP. It has been estimated that Single Farm Payments and Agri-Environmental grants comprise around £300m of income for farmers in Wales. Were these subsidies not maintained by UK Treasury many hill and dairy farms would face insolvency. Tariff-free trade with countries such as New Zealand and Canada would also affect the competiveness of Welsh agricultural processed products in UK markets.

This report was developed over a relatively short time-scale. Then at the outset it is important to note that at the time of writing there was considerable uncertainty over the UK negotiating position on EU transition, and uncertainty over the most likely transition scenarios, particularly following the June 2017 General Election result.

1.3 Objectives

Within the above context, the research sought to address the following questions:

- How might different post Brexit options (but with a focus on a hard Brexit WTO scenario) affect large and medium firms in Wales?
- What types of sectors represented could be most vulnerable to the EU transition process, and which sectors might gain new opportunities from the same process?
- What might EU transition processes mean for inward investment and trade in selected sectors?
- Is it likely that Wales will fare better or worse from the EU transition process compared to other regions of the UK?
- What would a change in investment levels or output among selected Welsh sectors mean for other parts of the regional economy (i.e. supply chain and household effects)?

- What would be the recommendations for Welsh Government following from the research, particularly in terms of assistance to business, trade support, location marketing, and future data requirements to better inform decision making?

In achieving these objectives the main strands of the research were:

- To briefly review recent literature on EU transition effects and to distil from this literature findings that might be of particular relevance for Wales.
- To analyse information on Welsh inward investment, and the value of import and export overseas trade into and outside of Wales. To analyse any information available on Welsh-UK regional trade.
- To analyse labour market information relating to EU residents working in Wales, and sectoral representation.
- To examine the operations and activity of a sample of large and medium sized firms in Wales to establish trade patterns, and then the expected exposure to both tariff and non-tariff barriers.
- To develop a consultation schedule which would be used to assess issues of EU transition risk, preparedness and opportunity.
- To summarise the findings from the consultation process with selected Welsh firms.
- To use the framework of the Input-Output tables for Wales and the UK to draw conclusions on how far changes in the outputs of selected sectors in Wales would impact on other parts of the regional economy.
- To draw the material together coming to conclusions of sectors at risk from EU transition, and then with recommendations for Welsh Government for its planning processes, and key issues to be considered in any negotiations with UK Government.

1.4 Structure of the report

The remainder of the report is structured as follows. Section 2 provides a summary of the main strands of the research analysis, and the structure of the consultations. Section 3 provides a review of the recent literature and brings out themes from this literature which might be of particular relevance to the Welsh economy facing the EU transition process. Section 4 comprises an analysis of the trade, and an appreciation of the expected tariff and non-tariff barriers which large and medium sized firms may face, together with related labour market issues.

Section 5 examines the findings from the consultation process with a selection of Welsh large and medium sized firms. Section 6 using the material derived from Section 3-5 examines how changes in economic activity (potentially associated with EU transition period) in selected sectors might have impacts of the Welsh economy. A focus here is an identification of sectors where changes in demands for their goods and services has below/above average effects on the Welsh economy (suppliers and households). Section 7 brings the strands of analysis together seeking to summarise the sector activity at risk and why. The final section concludes, signalling research priorities and recommendations for Welsh Government following from the analysis.

2 Structure of the research

2.1 Introduction

This section of the report describes the different strands of the research. Before doing so Figure 2.1 summarises how the EU transition process might work (or indeed is already working) to affect the activities of larger firms in Wales. Figure 2.1 is not comprehensive but seeks to pick out key areas of concern and risk.

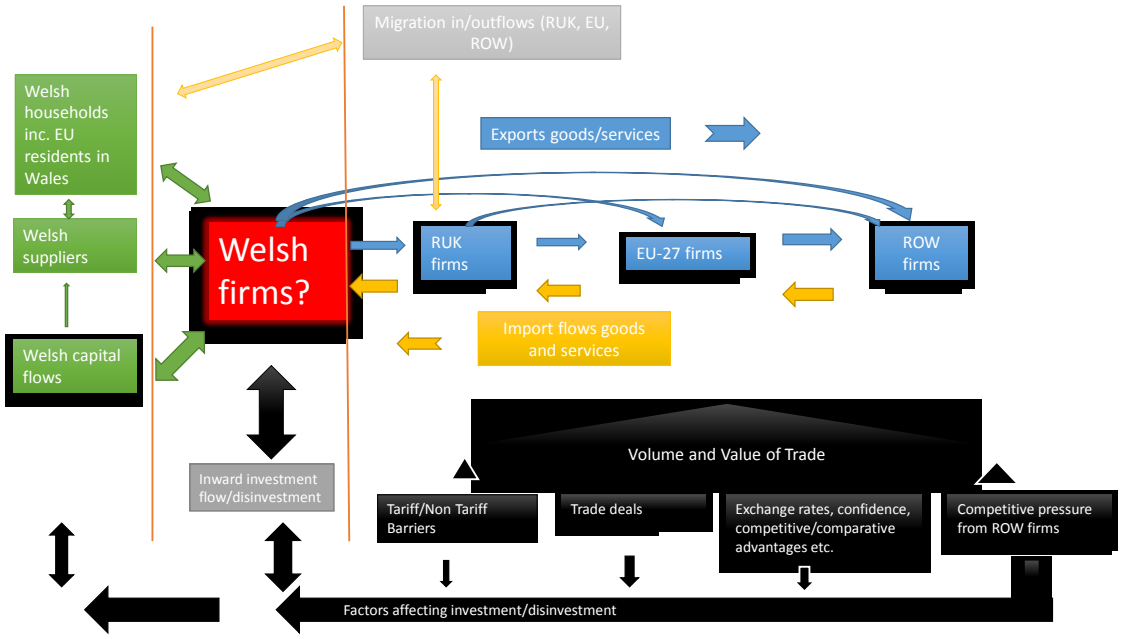
Larger Welsh firms vary considerably in their trade patterns. The very size of these firms suggests that sales to Welsh markets will, in the majority of cases, make up a small proportion of their activity. Figure 2.1 shows that these firms will export goods and services to other UK firms (who subsequently may export overseas), or such firms may export directly to the EU and the Rest of the World. Indeed selected Anchors and RICs are Wales' largest exporters, particularly in steel, chemicals and manufactured goods. Some care is needed here in linking export levels to underlying Welsh economic activity. While manufacturing exports in some sectors are very large this does not always reflect the level of value added to these products in Wales, such that the connection between exports and Welsh GVA is complex. Indeed, while manufactured exports tend to feature high in current concerns, the share of Welsh value added and employment in services trade needs also to be carefully considered.

Following from the above firms in Wales may send goods and services to other firms within the same group. Countering these intra and extra UK export trade flows are the import demands made by Welsh firms from firms in the UK (who may have imported goods and services from overseas), and from overseas directly. Importantly Figure 2.1 reveals that other than the actual output of the Wales larger firms, there are a large number of variables that affect these trade flows.

Then while the presence of tariff and non-tariff barriers, and the presence of deals with major trading partners are important, there are a host of other variables impacting these flows including exchange rates, macro-economic conditions, business confidence etc. Indeed it is changes in UK economy-wide investment and business confidence which could have the largest impacts. Inevitably many of the factors are inter-twined.

These same factors can also impact upon investment flows into and out of Wales. Figure 2.1 also shows that where trade and investment affects the nature and scale of local operations there will be a series of indirect and induced effects in the regional economy. For example, were poorer trade prospects to lead to firm disinvestment then there would be impact on regional supply chains and in Welsh households as employment opportunities and resulting household spending is lost.

Figure 2.1 EU Transition – Impacted Flows in Wales?



Finally Figure 2.1 recognises that human capital flows typically complement trade and investment flows. For example, selected sectors in Wales will make use of workers from the EU and Rest of World.

The process of EU exit starting with the Article 50 Notice, could have a wide variety of outcomes. Diverse scenarios depend on whether the UK and EU are willing to enter into a longer term agreement negotiation beyond two years, resulting in a temporary interim arrangement, or whether a long term relationship is negotiated within, and implemented at the end of the 24 month period (while also at the same time the UK completes negotiations with the WTO and makes arrangements necessary for associated third country free trade agreements).

With so much uncertainty and a lack, so far, of clarity on the actual objectives of the UK government, it is perhaps more useful to consider those sectors which potentially face the most risk (and perhaps opportunity) from a harder Brexit scenario. Under this scenario (and unless short term arrangements were made with EU partners) trade relationships between the EU and UK, and between UK and the rest of the world would be regulated through World Trade Organisation rules, and in some measure governed by the 'Most Favoured Nation' principle, whereby WTO members will treat each WTO member equally. An excellent analysis of different exit scenarios is provided by CBI (2017).

2.2 EU transition risk

Figure 2.1 revealed that there are a series of risks which might affect Welsh operations of large and medium sized firms. The different stands of analysis are used to inform a simple risk register, and then with this allowing an interim assessment of sectors (with strong representation of larger firms) which are expected to be subject to greater or lower levels of risk from the EU transition process.

This process is far from perfect, and no attempt is made in this report to weight the various risk components; risk components will be inter-related. However, the process adopted does allow policymakers to see where sectors might face multiple risks as a result of EU transition, and might aid a more targeted response. The process also identifies sectors which might be subject to lower levels of risk.

Table 2.1 provides a summary of the industry disaggregation. The degree of disaggregation is a major problem. Too broad a classification would be less than useful for policy recommendations, while a narrowly defined set of sectors would lead to excess complexity. The focus here was to identify sectors in which large and medium sized firms that are important to Wales, were represented. These larger firms (see Appendix 1) are sub-divided into 17 sectors. There is some reconciliation to SIC (2007) but this process is problematic. For example, very few of these firms fit into one neat standard industrial classification, typically having primary and secondary industry codes covering different the production of different commodities.

The SIC (2007) had been used to triangulate the analysis of Companies House records in Jordan FAME. The two digit SIC codes matching to the chosen sectors are therefore indicative. Moreover, the firms in these sectors do not offer a full representation of activity in the sector. For example, the three firms represented in Business Services do not provide a full representation of activity in this broad sector. Finally, some firms have activity in more than one of the 17 sectors; in these cases, they have been classified to the activity that represents the most significant part of their employment and value added in Wales. As noted in section 1, the sectors in Table 2.1 do not represent the whole economy of Wales. Other sectors, such as tourism, agriculture and fisheries will experience different but no less important impacts from Brexit. However analysis of these sectors is outside the scope of this report.

Table 2.1 Sector Groupings adopted in the Report

Sector	SIC 2007	No. Anchors/RICs
Aerospace systems and services	30 part, 33 part	8
Automotive, transportation and related	29, 30 part	10
Business services	69-82	3
Construction and civil engineering	41-43	8
Electrical engineering, electronic components, semiconductors	26-27	6
Energy & utilities	35-39	5
Financial services	64	6
Food and drink	10-11	16
Information and communications technology	58, 61-63	6
Insurance	65	2
Medical/health products and services	20 part, 21	10
Other advanced manufacturing and engineering	18, 22, 23, 25, 28, 31, 32, 33 part	11
Paper, wood, wood products	16-17	6
Process and chemicals	19-20 part	4
Steel	24	3
Textiles, clothing and marketing	13-14	1
TV production and creative	59-60	5

Table 2.2 describes the main risk components that are explored, and the underlying research strands. These are now described individually:

Effects of tariffs on company export trade directly and indirectly (i.e. through firm exports to RUK firms)*;* this component is based on the expected rate of WTO export tariffs which would be applied to sector products produced in Wales. However, also explored here are cases where firms supply to RUK firms that subsequently export to the EU (i.e. expected levels of WTO tariffs from firms which large and medium sized Welsh firms sell to in RUK). This is a partial assessment, with for example, Welsh firms selling to ROW firms that then import into the EU, and even cases of export to EU subsidiaries that subsequently import final goods back into the UK. However, the objective here is to highlight sectors which might be affected directly and indirectly by higher levels of tariffs.

Effects of tariffs on inputs*:* large and medium sized Welsh firms may import goods and services from outside of the UK. Such firms might face cost pressures were tariff rates to change on products, or indeed might face cost pressures indirectly where their UK suppliers import from EU and ROW states. More generally here there is the prospect in some cases of EU transition and resulting trading arrangements under a hard Brexit scenario, making imported goods and services from ROW firms to the UK cheaper. This could also have ramifications for the competitiveness of Welsh business.

Effects of non-tariff barriers on trade and activity*;* the risks that might be associated with non-tariff barriers of different types including rules of origin regulations, product standards etc, are separately identified. There is some expectation that risks here may be the most problematic to evaluate given the large variety of possible non-tariff barriers that could affect Welsh sectors.

Labour market risks: dependence of EU staffs, or cost/skills pressures resulting from inability to use EU staffs: the developed risk register recognises that some sectors make more use of EU staffs than others. Good examples are some parts of the Food and drinks, and Furniture sectors in Wales. However, firms also employ EU staffs in research and technical roles. Any changes in the ability of EU staffs to work in Wales could result in skills shortages for these firms, or at the very least upward pressures in costs lessening Wales' attractiveness as an industry location. Labour market risks are potentially more important for some of the sectors not included in this report, such as Tourism and Agriculture.

***Effects in regional economy of changes in activity**:* each of the elements of the risk register has ramifications for the Welsh economy. However, this element seeks to show explicitly how a change in the scale of operations (positive or negative) in sector activity might impact upon the Welsh economy through supply chain and household effects. In this respect among Anchors and RICs for example, some are more embedded into the regional economy than others in terms of regional goods and services that they produce. Similarly, any change in the scale of their operations could have marked 'multiplier' effects in other parts of the Welsh economy.

Effects linked to EU networks and institutions: firms can gain much from EU knowledge and innovation networks. EU transition also directly affects the ability of these firms to take advantage of EU public procurement opportunities.

Current age and structure of assets in Wales, and current susceptibility to investment cycles: this component recognises firms and sectors with older assets, or with goods and services that are mature or coming to the end of their life cycle. These firms might find it more difficult to secure new investment during the period of EU transition or after exit. For example, where one product is coming to an end of its life cycle, then the Welsh subsidiary may have to compete against other EU and ROW locations for new plant or investment to enable the production of successor products.

***Sector firms positioning in corporate network and corporate options to displace regional activity**:* this links through to the above risk criteria in part. For example the extent to which operations in Wales' larger firms are undertaken elsewhere is considered. For example, a manufacturing company may be able to produce components made in Wales across several different locations which means should EU transition result in more problematic or costly production in the UK, that production can be quickly moved elsewhere. Corporate options to relocate activity also connect to issues about the uniqueness of Welsh assets, sunk costs, the value added of regional operations, and more indirectly how far local management teams have choice in terms of investment decisions. For example, some local management teams may have more autonomy in strategic investment decisions than others.

Within the research, and even using the evidence derived from multiple sources. It is only possible to provide some indication of the scale of these risks in each of the 17 sectors. Moreover, the risk assigned to each of the 17 sectors may not accurately describe the risks facing each individual *company* within that sector. However, the approach does allow some identification of the extent to which some sectors are more likely to experience difficulties through the process of EU transition.

Table 2.2: EU Transition Risk Register

EU Transition Risk Register	Evidence developed from:
Effects of tariffs	Literature review, Firm level consultations, roundtables WTO and HMRC data
Effects of non-tariff barriers	Firm level consultations, roundtables
Labour market risks	WG/ONS Employment in Wales by industry and country of birth Firm level consultations, roundtables
Effects in regional economy of changes in activity in the sector	Wales Input-Output framework
Effects linked to loss of access to EU knowledge and innovation networks and frameworks	Firm level consultations, roundtables
Current age and structure of sector assets in Wales, and susceptibility to corporate investment cycle	Press & Secondary information, Companies House analysis, Welsh Government sector teams
General sector firms positioning in corporate networks, levels of Welsh embeddedness in terms of functions and assets, and likely options to displace Welsh activity	Companies House analysis (corporate trees) Firm level consultations, roundtables

Table 2.3 provides a summary of how risks of EU transition were rated in this report. A simple coding of high to low is used. The analysis rated every sector using this framework. There is an element of subjectivity in this process, but the approach can alert the reader to those sectors which might be most at risk from EU transition. There will be some firms in each sector where the generalised ranking does not apply. Perhaps more importantly the approach also allows some consideration of the sectors most at risk in the short term prior to 2019 irrespective of the progress of EU transition negotiations.

Table 2.3 Risk Examples

Risk factor	High example	Medium example	Low example
Effects of tariffs on sector export trade directly and indirectly (i.e. via exports to RUK firms); linkages here to sector ability to develop new markets, and exposure to EU markets	Sector firms generally characterized by strong direct/indirect export dependency. Value added tariffs (WTO) on sector goods directly (or indirectly as Welsh components used in UK production and subsequently exported) often range above 3% to 10%	Some export dependency directly and indirectly. Value added tariffs (WTO) on sector goods directly (or indirectly as Welsh components used in UK production and subsequently exported) often range 1-3%	Either non-applicable as sector firms generally engage in limited EU trade, or products or services attract no/negligible tariff duties
Effects of tariffs on inputs	Sector firms have a strong direct import dependency. Value added tariffs (WTO) on major imported goods above typically above 3%. Limited opportunity to displace imports with UK sources	Some direct import dependency. Value added tariffs on imported goods c. 1-3% but opportunities to displace with UK sources	Either non-applicable or sector uses limited imported goods in Welsh production
Effects of non-tariff barriers on trade and activity	Sector has firms with strong export dependency. Sector expected to be seriously affected by multiple barriers relating to origin, product standards, registration, with serious effects on ability to trade in EU and ROW	Some export dependency and sector firms expected to suffer some effects resulting from non-tariff barriers.	Largely non-applicable, or sector largely trades in UK
Labour market risks: dependence of EU staffs, or cost/skills pressures resulting from inability to use EU staffs	Sector in Wales uses relatively large numbers of EU staffs and inability to use such in low or high value added operations would significantly affect Welsh operations	Sector operations in Wales uses some EU staff in high value functions, or might be affected by difficulties in moving staff between EU plants	Little or no dependence of staffs from EU in Welsh operations
Effects in regional economy of changes in activity	A change in the activity of the sector would have an above average effect on the regional economy in terms of induced/indirect economic effects (GVA and employment)	A change in the activity of the Welsh sector would have an average effect on the regional economy in terms of induced/indirect economic effects (GVA and employment)	A change in the activity of the Welsh operations of the sector would have a below average effect on the regional economy in terms of induced/indirect economic effects (GVA and employment)
Effects linked to loss of access to EU knowledge and innovation networks and frameworks	Firm prospects in Wales in this sector could be significantly damaged were EU transition to lead to loss of ability to participate in EU research/institutional frameworks	Firm prospects in Wales in sector might be damaged were EU transition to lead to loss of ability to participate in EU research/ institutional frameworks	Either not applicable or very limited effects associated with EU transition.
Current age and structure of assets in Wales, current	Sector is producing largely mature goods and/or	Sector firms have a mixed portfolio in which	Either largely non-applicable/ less of an

susceptibility to corporate investment cycles	towards end of life cycle, or where significant new investment would be needed in short run (1-3 years) to maintain Welsh employment	some elements are mature and would need significant short run (1-3 years) investment to secure Welsh employment	issue in the sector, or sector is producing goods/services in growth stage, or with more stable life cycle behavior
General sector firms positioning in corporate networks, levels of Welsh embeddedness in terms of functions and assets, and likely options to displace Welsh activity	Firm in this sector tend to have regional operations which are replicated elsewhere in EU/ROW, such that lower costs to displace activity; Welsh activity more of branch plant type; limited embeddedness	Welsh operations are fairly specific, but lower levels of embeddedness in regional economy in terms of staffing and local decision making capacity	Welsh operations/ assets fairly specific and high costs in exit. Significant HQ-type functions, and higher embeddedness in terms of quality of local staffs. Significant decision making capacity in Welsh sector operations

2.3 Strands of analysis informing the risk register

Literature review

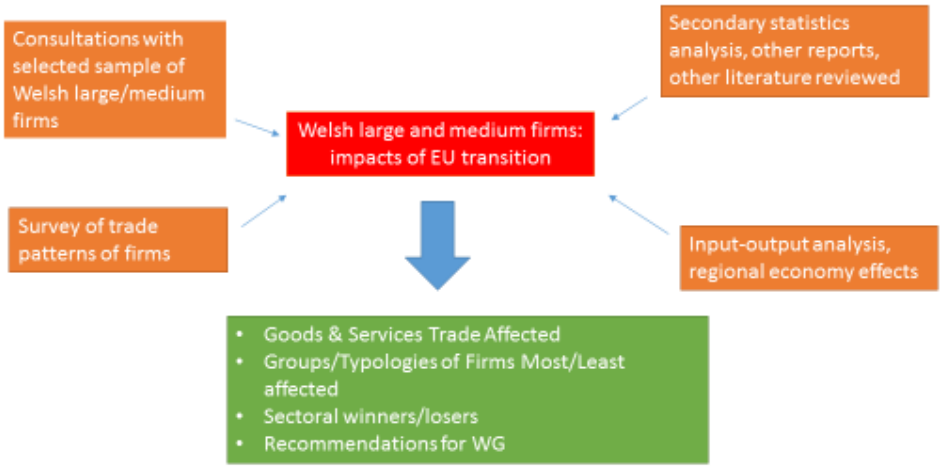
Figure 2.2 summarises the main strands of the analysis undertaken to inform the evaluation of at-risk sectors. A great deal has been written about the process of Brexit, and expected macro-economic effects, together with forecasts of expected impacts of growth. Selected of this research literature was reviewed particularly where it yielded sectoral level information, and this is summarized in Section 3.

Secondary data

Secondary data relating to Welsh overseas trade and inward investment has been examined to identify trends in both. Key sources here have been Welsh Government, HMRC and Office for National Statistics. The *Annual Population Survey* data has also been examined, relating to EU Residents working in the Welsh economy. Press coverage and firms' press releases related to future investment are also a consideration here, although with some awareness of the potential for misinterpretation.

With respect to data on the current operations of particularly the larger firms in Wales, some information was held by Welsh Government in terms of sales and employment at Welsh operations of these firms. Selected information here was available from the consultations (see below). However, it was also possible to gain access in a number of cases to Companies House data (stored on the Bureau van Dijk FAME database) relating to firms' goods and services, and recent trends in firm performance, and to clarify ultimate ownership details of firms.

Figure 2.2 Research Sources



Secondary data, combined with findings from the consultation process allowed the team to begin an assessment of defined sectors of:

- Age of plant/subsidiary and life position of goods and services produced in Wales;
- The position of Welsh subsidiaries in European/global value chains;
- Recent performance in terms of sales, employment;
- Types of products and services produced;
- Estimated patterns of overseas trade.

This assessment then allowed some analysis on how far goods and services produced might be affected by the imposition of WTO tariffs, and perhaps more importantly the likely risk associated with non-tariff barriers. Intelligence on WTO 'most favoured nation' tariff structure for commodities was derived from data available on the WTO website.

2.4 Consultation

A key strand of the research was a consultation process, largely with a purposeful sample of large and medium sized firms. As far as possible the consultation involved a variety of firms differentiated by size, sector, ownership (foreign and domestic firms), value added and production characteristics, and trade characteristics. Consultations were undertaken by Welsh Government staff and with Cardiff University team analysing the findings of the consultation to establish common themes and link these to other strands of analysis. The consultation guides have been placed in Appendix 2 to this report. In particular the consultation was designed to:

- Examine how Brexit options (particularly a potential WTO model) would affect Welsh businesses directly and indirectly.
- Identify sectoral winners and losers (and vulnerable sectors), as well as any opportunities for businesses in Wales.
- Identify the value of import/export trade within consulted firms.
- Consider relevant supply chain impacts (indirect effects in the regional economy).

The consultations were divided into five main sections. In summary key issues dealt with under each set of questioning were as follows:

Business basics

- brief description of products and services, and short and long run prospects for new products and services
- ownership structure and role of subsidiary/firm in strategic decision making, and role of the subsidiary in the wider corporate/international group.
- current trends in employment and output
- commentary on how far operations might be affected by any changes in regulations around the freedom of movement of labour, and how this might affect the supply of skills to the firm, and future demand for skills.

Trade and linkages

- review of main markets for goods and services (and extent to which products go on to other group companies, and extent to which to RUK, EU, Rest of World markets); and extent to which products are sold to RUK or other Welsh firms who subsequently export to EU states.
- review of the main purchases made and whether from Wales, RUK, EU or ROW.
- review on how far there is export trade with states with whom the EU has trade agreements.
- commentary on other non-trade linkages/alliances held with EU partners/institutions, and membership EU-led consortia (i.e. selected defence/ICT firms).

Preparedness and planning

- outline of any subsidiary/group plans to treat with Brexit issues; e.g. options analyses, activity to develop alternative markets.
- assumptions being taken within the firm/subsidiary on post Brexit conditions (i.e. is firm assuming a movement towards WTO rules on trade).
- firm knowledge of the level of tariffs facing products were the UK to come out of the Single Market and operate under WTO rules.
- firm knowledge of regulations around rules of origin and the definition of an EU made product.
- how far existing trade within the EU might be impacted by different non-tariff barriers following Brexit (i.e. regulatory standards adhered to; rules of origin, certification and testing etc.)

Consultee views on key EU-transition issues/opportunities

- where respondents were asked to rate the importance of a series of EU transition risk factors for their business, and a series of opportunities.

Role of Welsh Government

- respondents were asked whether their firm/group in Wales was making representations about Brexit.
- respondents were asked how Welsh Government could play a role in providing intelligence and information and how Welsh Government might focus efforts in representing Welsh business interests around EU transition to UK government.

In addition to the specific consultation undertaken for this report, earlier consultations undertaken by sector teams, and consultations undertaken with wider industry via fora/roundtables have informed the findings in this report.

2.5 Input-Output tables

The framework of the Input-Output tables for Wales was used to consider how far changes in defined sector economic activity would have impacts on the Welsh economy. Manipulation of the Input-Output Tables (see Section 6) allowed the team to show how changes in output or employment in sectors would have multiplier effects in the regional economy. For example, changes in the output and employment of a manufacturing sector, might mean a reduction in the purchases made by that sector in the Welsh economy i.e. resulting in a series of supply chain and household income effects. For this analysis it was necessary to understand:

- the pattern of regional purchases made by the large and medium sized Welsh firms
- the extent to which these firms support local household incomes
- the actual size of the respective firms.

As part of the consultation process firms were requested to complete an Input-Output questionnaire providing details of their purchases and sales. This had the added bonus of providing some information of the pattern of RUK sales of selected firms. Moreover, for a small number of the largest firms input-output type data was available from previous Cardiff University projects with these firms. Finally, where firms were unable to provide data, the Tables themselves could be used to explore the average spending behaviour of firms within the defined sectors.

3 Research review

3.1 Introduction

This section of the report reviews recent material examining the expected effects of Brexit. At intervals in this section some attempt is made to relate the review findings to the Welsh economy. It is not possible to review in detail all study findings but here the key material and conclusions are reviewed. The material used to inform this review is summarised in the references.

3.2 Economic Growth

The Welsh economy is so tightly interlinked with that of the UK that some inference on Welsh prospects can be drawn from UK-level analysis. However, some care is required here because the Welsh economy is structured rather differently and has a stronger representation in some industries rather than others, and, in many sectors, lower productivity levels. Linked is the fact that Wales also has far lower levels of gross value added per capita than many parts of the UK, and has been beneficiary to significant levels of EU structural funding. For these reasons drawing strong inference from UK level research is problematic.

Predictions of the Brexit impact on economic growth vary between different studies. In part this is caused by different assumptions of the counterfactual, and different modelling techniques (Busch and Matthes, 2016). For Welsh Government one key issue is strong variation in the scale of predicted effects, but with some consensus that expected Brexit scenarios will reduce UK GDP growth (Booth et al. 2015).

PwC (2016b) predicts that GDP per capita after Brexit would be 3.0% lower in a FTA scenario and 5.4% lower in a WTO scenario in 2020 compared to the real UK GDP in the counterfactual where the UK remains in the EU. Average GDP per capita could drop by between 0.8% to 2.7% in 2030 comparing to the counterfactual scenario of staying in the EU. Ottaviano et al. (2014) examine the likely impacts of the UK leaving the EU. In their optimistic scenario (UK enjoying similar access to the EU internal market as currently – similar to Norway), the static losses in UK GDP are predicted to be

1.1% compared with the counterfactual of the UK staying in the EU. In their pessimistic scenario (trading on WTO rules) the predicted UK GDP is predicted to fall by 3.1% compared with the counterfactual prediction of not leaving the EU.

Ebell and Warren (2016) project that in 2030, UK GDP would be 1.5% to 2.1% lower in a 'Norwegian' scenario, 1.9% to 2.3% lower in a 'Swiss' scenario, and 2.7% to 3.7% in the 'WTO' scenario compared with the baseline forecast where the UK remains in the EU. The long-run deterioration in the terms of trade leads to a decline in wages of between 2.2% and 6.3% compared to the baseline prediction of staying in the EU in 2030. However, there is little perceptible long-run impact of Brexit on unemployment. In the longer term labour productivity could be affected by lower levels of foreign direct investment (FDI), a smaller pool of skills and slower technical progress.

These types of productivity effects related to changing levels FDI could be particularly acute in Wales where some of the highest levels of manufacturing labour productivity are in the foreign-owned sector. Van Reenen (2016) quantifies the static effects of Brexit on trade and income compared to staying in the EU. In his "optimistic" scenario, the UK (like Norway) obtains full access to the EU single market. This will result in a drop in household income of £850 per household per year. In a "pessimistic" scenario with larger increases in trade costs, Brexit will lower household income by £1,700 per household per year. Taking into the account of the fact that reduced trade weakens productivity in the long-run, it is predicted that Brexit will lower income by £4,200 to £6,400 per household annually.

HM Treasury (2016) also shows that trade and investment flows could be lower after Brexit, reducing the UK's economic openness and interconnectedness. After 15 years of the 'Brexit', compared with the counterfactual prediction of staying in the EU, the annual GDP level would drop by 3.8% in an 'EEA scenario', 6.2% under a negotiated bilateral agreement, or 7.5% under a WTO 'hard Brexit' scenario. The negative impact on GDP would also result in lower tax receipts, seen to considerably outweigh any potential gain from reduced financial contributions to the EU. HM Treasury shows that the effects of trading with the EU under a WTO scenario, compared with the counterfactual situation of the UK remaining in the EU, would by the end of 2030, result in a total trade loss of 24%, a fall in FDI of 22%, and an overall GDP fall of 7.5%, but with no effects linked to a fall in migration.

Based on the HM Treasury (2016) assumptions, Gudgin et al. (2016) compare the pre-referendum forecasts with different scenarios after Brexit. Gudgin et al. (2016) find that if the UK trades with the EU under an EEA membership, GDP would drop by 2% compared with the counterfactual situation of the UK remaining in the EU by the end of 2025. If the UK trades with the EU under a WTO membership, the loss of GDP would be nearer 5%, and the loss of GDP per capita would be 2% compared with the counterfactual situation of the UK remaining in the EU by the end of 2025. Under this latter scenario they also predict less unemployment but more inflation.

In order to facilitate comparison with the estimates produced by the HM Government of the long-term impacts of Brexit, Portes and Forte (2016) also calculate the impact on GDP per capita of changes to free movement of labour up to 2030. In a central scenario where Brexit reverses half of the impact of free movement, GDP per capita will fall by 3.4% in 2030 compared with the counterfactual prediction of not leaving the EU. In a more extreme scenario where Brexit reverses the entire effect of free movement, GDP per capita will fall by 5.4% in 2030 compared with the counterfactual prediction of staying in the EU.

Wadsworth et al. (2016) estimate the impact of immigration on the UK after Brexit. They find that EU immigration has not had significantly negative effects on average employment, wages, inequality or public services at the local level for the UK-born. At the national level, falls in EU immigration linked to EU transition were likely to lead to lower living standards for the UK-born. This was partly because immigrants were more likely to work and pay tax and less likely to use public services as they are younger and on average better educated than the UK-born.

As stressed above the difficulty here is that these are average expected effects. In the past Wales has been shown to react quite differently to economic shocks. Indeed, we would also expect the magnitude of economic shocks to vary between urban and rural areas of Wales, and with some sectors and activities facing more risks than others.

3.3 EU Trade

Recent research shows that in most, if not all, Brexit scenarios trade costs between the UK and the EU will increase. Overarching themes in recent economic commentary on Brexit have been trade and coordination costs for business. Increasing trade and transactions costs resulting from tariff and non-tariff barriers could affect new investment into the UK, while making it more difficult for existing firms to ship goods to EU and other international markets. Different regulatory standards could make engineering, R&D and consultancy services more difficult to sell into Europe (Head and Mayer, 2015).

Analysis also flags up barriers in terms of health, safety and environmental standards as well as rules of origin requirements. Inevitably, economic modelling assumes increased costs borne by businesses will be passed to consumers. There is also the prospect of increasing co-ordination costs between headquarters and the local production plants.

Under a Free Trade Agreement based relationship, the UK and the EU would negotiate the terms of access for sectors, including the standards and regulations that apply in those sectors. The EU tradition of harmonisation, rather than mutual recognition, means the choice for the UK would likely be to either adopt the EU standards or for firms to bear the cost of meeting two sets of standards.

Tariffs negotiated under a Free Trade Agreement are likely to be negotiated to a level close to the current levels within the EU (i.e. zero). However, in a hard Brexit World Trade Organisation (WTO) scenario, tariffs would increase to WTO's most favoured nation levels. These are higher than the current levels, and could impact trade flows in some goods (PwC, 2016a).

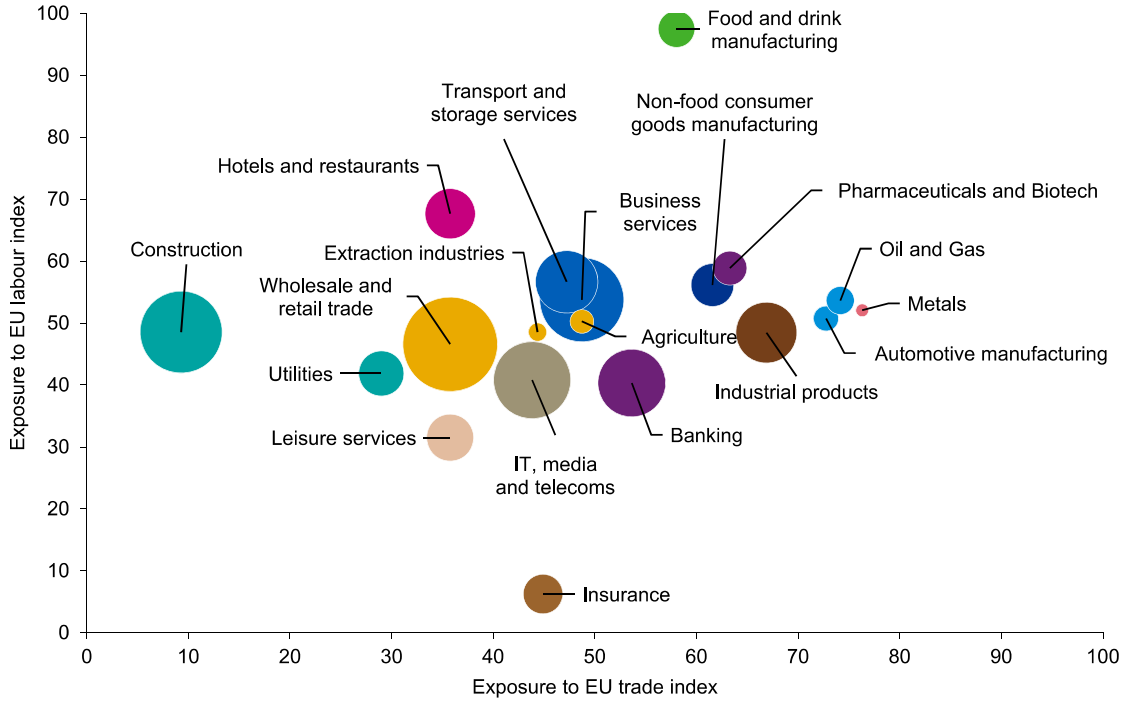
Analysis varies in what this might all mean for the UK. It is important to recognise that estimates of effects vary considerably, and modelled and forecast approaches make very different sets of assumptions. Dhingra et al. (2016) estimate the consequences of an 'optimistic' scenario where the UK obtains full access to the EU single market like Norway and 'pessimistic' scenario in which case the UK would trade under the WTO rules. They find that even in the optimistic scenario, there is an overall fall in national income of 1.28% compared with not leaving the EU, driven largely by current and future changes in non-tariff barriers. Again this is important in that it is non-tariff as opposed to tariff barriers that play a particularly important role in restricting trade in services, an area where the UK is a major exporter. Dhingra et al. (2016) also argue that costs of reduced trade outweigh the fiscal savings in either an optimistic or pessimistic scenario.

3.4 Sector perspectives

Analysis at the level of individual sectors is hindered by the problem of aggregation. For example, one might conclude that food and drink sectors might be disproportionately affected by high tariffs, but there are parts of the sector that will be less affected than others (i.e. parts that do not export). Similar conclusions might apply to automotive activities. For Welsh Government then, the issue of sectoral aggregation is an important one in policy responses, and in making representations to UK Government. Critically, conclusions on sectoral risk from EU transition might vary according to the sectoral aggregation adopted. Arguably, while one might make conclusions on the average level of value added tariffs facing broad groups of commodities, this is far more difficult in the case on non-tariff barriers.

Research has explored sectoral vulnerability on a dual exposure scale i.e. the proportion of EU nationals as part of each sector's workforce and exports as a share of each sector's output (i.e. GVA) (see for example KPMG Economics Insights, 2017). This is similar to the approach adopted later in this report although we attempt to develop more categories of risk that are appropriate to the Welsh case. The KPMG (2017) approach provides a useful summary of sectors which might face relatively more pressure (see Figure 3.1). Clearly food, automotive and metals are shown to be relatively at-risk sectors here, and these same sectors employ large numbers of people in Wales.

Figure 3.1: KPMG (2017) Analysis of At Risk Sectors



Source: ONS data, KPMG calculations. The size of the bubble represents the size of the sector as measured by GVA compared to UK total.

Key exporting manufacturing sectors in the UK include automobile, chemicals and pharmaceuticals, capital goods, and machinery. In the services sectors three key exporting sectors are financial services, insurance, and professional services. Welsh activity in these sectors varies. For example financial services in Wales employed around 14,200 people in 2015 while chemical and pharmaceutical combined employed around 7,900 (ONS, Business Register and Employment Survey, 2015).

In what follows we identify some key issues identified in reviewed reports and analysis in respect of these sectors, and make some conclusions which could be particularly relevant for large and medium sized firm prospects in our defined sectors. This is not designed to be a comprehensive coverage of sectors at this stage, but rather to alert the reader to the types of issues facing a sample of sectors of importance to Wales. After each section commentary we place our own conclusions on how the material might be relevant for Wales.

Automotive

- According to the European Automobile Manufacturers' Association, 80% of cars assembled in the UK were sold abroad, around 58% of which were exported to the EU. This corresponds to €14.6 billion and a value share of 52.8% of total automobile exports from the UK (PwC, 2016c).
- According to European Movement International (2017) were the UK unable to negotiate a trade deal, then tariffs on cars could be around 10%, and with this affecting volume manufacturers in the UK, such as Honda, Nissan, Toyota and Vauxhall that are all oriented to the EU market. Premium manufacturers such as BMW Group and Jaguar Land Rover would be less reliant on the EU and affected less in comparison (Booth et al. 2015).
- The UK automobile sector relies on imported parts and components. PwC (2016c) makes the point that import dependence in the sector could also force manufacturers to increase car prices to stay profitable if tariffs apply post-Brexit with implications for the competitiveness of cars exported to the EU.
- Head and Mayer (2015) estimate the impact of Brexit on car production in the UK considering both increased trade costs of exporting and the higher costs of headquarters co-ordination. Total UK car production is predicted to fall by 12% or more than 180,000 cars per year compared to staying in the EU. This is mainly because European car manufacturers such as BMW move some production away from the UK.[3] Prices faced by UK consumers also rise by 2.6% as the cost of imported cars and their components increase.

CBS Conclusion: these types of developments would expose large and medium sized firms directly and indirectly involved in automotive. Of particular concern here

[3] See http://www.reuters.com/article/us-britain-eu-bmw-mini-idUSKBN19M3KN

could be engine manufacturing facilities e.g. Toyota (Deeside) and Ford (Bridgend) and key firms linked to the automotive sector such as Calsonic (Llanelli) and Schaeffler (Llanelli). However, given high sunk costs in some parts of the sector in Wales, issues are most likely to arise when current product/engine lines are revised.

Chemicals and pharmaceuticals

- There is a tendency in prior analysis to group these two sectors together but they are different in terms of scale, operational nature and then exposure to trade pressure.
- European Movement International (2017) showed that the chemicals and pharmaceuticals sector employs 0.52% of the UK labour force and represented a 9.9% share of total UK exports of which 57% were destined for the EU. They showed that were the EU-UK unable to negotiate a deal, then tariffs on chemicals will be 4.6%.
- Booth et al. (2015) make the point that this is a highly traded sector, reliant on companies across the EU to trade basic chemicals to produce sophisticated products. Leaving the EU customs union would then disrupt supply chains.
- Leaving the EU could have a wide range of effects on the pharmaceutical industry in the UK. For example, patent restrictions cease across the EU when a product is placed on the EU market. This allows some firms with appropriate licenses to obtain drugs sold at a lower price in some parts of the EU, and then import them into a member state where prices are higher. This type of trade forms a significant share of total pharmaceutical sales in some states and would be affected post-Brexit.
- An issue for the pharmaceutical industry in the UK is whether the UK would continue to be part of the EU's patent exhaustion zone after Brexit. If not, parallel trade to and from the UK will close, probably leading to a rise in the cost of drugs for organisations such as the NHS (Europe Economics, 2016). Moreover, post-Brexit, UK pharmaceutical companies would no longer have automatic access to the EU's Research and Innovation programmes, such as Horizon 2020. A post Brexit world could also add to pharmaceutical costs in terms of clinical trials.
- According to the Association of the British Pharmaceutical Industry, pharmaceutical companies may need to set up separate trials for the UK, driving up costs and time. Therefore, these companies together with medical technology suppliers may favour running trials in EU member states to access a larger market (PwC, 2016e).

- EU firms may not have access to UK trial data and vice versa. Moreover different post Brexit approvals systems would create increased administrative burdens and costs to UK pharmaceutical companies.
- The UK would have more flexibility to develop incentives to attract innovative activities and new investment in a post Brexit world.

CBS Conclusions: for large and medium sized firms in the Welsh pharmaceutical and medical products sectors it is non-tariff barriers that will have to be monitored carefully, and with the extent of the issue in part related to where the Welsh firms are in European and global supply chains. At the very least it is expected that pharmaceutical firms based in the UK and Wales will have to consider more carefully where they place different activity functions in future.

Food and drink

- Analysis by European Movement International (2017) reveals that tariffs on processed food under a hard Brexit could be around 15% and for other products tariffs could be exceed 50%, with dairy products and meat attracting particularly high tariffs.
- Under a hard Brexit selected food manufacturers could benefit from sourcing cheaper inputs and ingredients from non-EU countries, and with the result that their exports would be more competitive. However, Booth et al. (2015) show that these advantages might be counterbalanced as some UK based food and drink sectors would face strong non-EU international competition as rival imports into the UK face lower tariffs and become relatively cheaper. Furthermore, tariffs would impact whole supply chains from imported products ready for retail, to input costs such as feeds and fertilisers (European Union Committee, 2017).
- Selected elements of the food and drink sector are linked to local Welsh supply chains, and with EU transition expected to impact prospects here also, particularly in terms of sources of funding (Woolford and Hunt, 2016). For example the EU sets the overarching policy and legislative framework on animal health, hygiene and welfare. EU Regulations currently govern areas such as the control of diseases, welfare of animals at the time of slaughter and during transportation, and the export and import of live animals and animal products. It is also at the EU level that external trade agreements on agricultural products are developed on behalf of all Member

States. Current external countries include South Africa, Mexico, Egypt, Morocco and a block of Central American countries. Products exported by Welsh farmers to these countries currently benefit from tariff reductions and import quotas agreed by the EU (National Assembly for Wales, 2016).

CBS Conclusions. High levels of tariffs connected to the food and drink sector, combined with significant levels of Welsh activity in the sector (around 14 RICs in this sector alone) make this an area of concern. A high proportion of Welsh exports of food and drink products are destined for EU markets (see later). In some selected cases export prices to the EU are bolstered by EU protected food names, such as protected Geographical Indication (e.g. Welsh Lamb and beef), and Protected Designation of Origin designations (e.g. Traditional Welsh Caerphilly Cheese, Anglesey Sea Salt - see Woolford and Hunt, 2016).

Capital goods and machinery

- The capital goods and machinery sector would face relatively low tariffs in a hard Brexit environment. European Movement International (2017) estimate average WTO tariffs on machinery of between 1.7% and 4.5%. Around 45% of machine tools exports from the UK go to other EU countries, and UK-manufactured machine tool makers spend around 25-30% of costs on importing materials and components from within the EU.
- Relocation of production facilities would be less likely to take place in the short term by large international firms. However, if non-tariff barriers develop over time, some production would be shifted to the EU (Booth et al. 2015). Foreign companies have a large presence in the UK machinery industry. Hindering their abilities to do businesses with the EU would raise questions over investment decisions in the future (Manufacturing Technologies Association, 2017).

CBS Conclusion*:* Machinery and mechanical engineering in Wales would face export and import tariffs, but is also vulnerable to selected non-tariff barriers such as rules of origin regulations. Moreover, inward investors in the sector in Wales are often part of large international groups with some flexibility to move production overseas.

Financial services and insurance:

- The financial services sector is a major export sector generating a large grade surplus of £55 billion in 2015 (London Assembly Economy Committee, 2016). There is some consensus in reviewed material that financial services are exposed by EU transition processes, and would be an area where a deal would be hardest to negotiate after Brexit.
- The UK sector benefits from a "financial passport" that allows firms such as banks, insurers and asset managers to sell financial services and establish branches anywhere in the EU without other European countries imposing different or additional requirements. For this reason, international banks and financial institutions establishing subsidiaries in the UK can access the single market and avoid complex and uncertain third country access requirements. This benefit would be available after leaving the EU under selected exit scenarios (Moloney, 2016). Without passporting, UK firms (and US and Swiss financial services from operating in the UK) would need to establish subsidiaries to service EU customers (London Assembly Economy Committee, 2016).
- Once leaving the EU, a UK-based bank would require a license in each EU country incurring duplication and substantial additional costs (BBA, 2016).

CBS Conclusion: Wales has relatively low levels of specialisation in high value added financial services. Some firms offering insurance services could be affected. For example, Admiral Group Plc operates in Wales, Europe, North America and Asia. Additional requirements and costs could apply without financial passporting.

Professional and business services

- Potential barriers to the EU market in these sectors consist primarily of national market access regulations rather than tariffs (European Movement International, 2017).
- Business services are a significant export, accounting for 44% of all the UK's trade in non-financial services. Studies have suggested that increases in service trade restrictions with EU countries would reduce service imports and exports to and from the UK.

- London First (2016) showed that were EU members to impose restrictions on non-EU members to the full extent under the WTO rules, the annual reduced UK service exports and imports would be in a range from £27 to £34 billion.
- UK-EU regulatory divergence may result in a lack of implementation of international standards, where standards exists, which may create additional costs for UK service suppliers.

CBS Conclusion: in Wales business and professional services covers a wide range of activity. It seems likely that different non-tariff barriers will affect parts of this sector in a multitude of ways, such that making any generalisations on the impact of EU transition on this sector would be problematic.

3.5 Conclusion

It is impossible to review all the material that has been written on the impacts of Brexit processes on the UK economy within the timescale of this report. However, some broad conclusions can drawn from the discussion above as follows:

- There is some consensus around negative GDP, trade, labour market and investment effects of a hard Brexit on the UK economy.
- The tight interlinkages between the Welsh and UK economy mean that the region will at the very least be affected in parallel with the UK economy.
- In considering whether Wales might be more or less affected by EU transition processes in the short run and long run it is necessary to consider both current and forecast sector specialisation, with some sectors expected to be worse affected than others.
- It is fairly straightforward to examine the expected level of import and export tariffs on commodities that would occur under a hard Brexit 'WTO' rules scenario. Much more difficult is to examine the effects of non-tariff barriers.
- The sectoral aggregation adopted in any analysis is important, particularly when considering non-tariff barriers. It is even possible that firms producing almost identical commodities and services could be affected very differently by non-tariff barriers according to how precisely they trade.

3.6 References

BBA, 2016. Brexit quick Brief #3. Available from: https://www.bba.org.uk/wp-content/uploads/2016/12/webversion-BQB-3-1.pdf. [Accessed 27th May 2017].

Borchert, I. 2016. Services trade in the UK: what is at stake?. Available from: https://www.sussex.ac.uk/webteam/gateway/file.php?name=briefing-paper-6-final.pdf&site=18. [Accessed 27th May 2017].

Booth, S., Howarth, C., Persson, M., Ruparel, R., & Swidlicki, P. 2015. The consequences, challenges and opportunities facing Britain outside EU. Available from: http://europas-krisen.zdf.de/media/downloads/Brexit/150507-Open-Europe-What-If-Report-Final-Digital-Copy.pdf. [Accessed 22nd May 2017]

Busch, B., & Matthes, J. 2016. Brexit – the economic impact a meta-analysis. Institut der deutschen Wirtschaft Koln Report 10/2016.

Deloitte 2016. What Brexit might mean for UK travel. Available from: https://abta.com/assets/uploads/general/ABTA_Brexit_online.pdf. [Accessed 15th May 2017].

Dhingra, S., Ottaviano, G., Sampson, T., & van Reenen, J. 2016. The consequences of Brexit for UK trade and living standards. Available from: http://cep.lse.ac.uk/pubs/download/Brexit08_book.pdf#page=40. [Accessed 10th May 2017].

Ebell, M., & Warren, J. 2016. The long-term economic impact of leaving the EU. Available from: http://www.niesr.ac.uk/sites/default/files/publications/National%20Institute%20Economic%20Review-2016-Ebell-121-38.pdf. [Accessed 15th May 2017].

Europe Economics 2016. Brexit and the pharmaceutical industry. Available from: http://www.europe-economics.com/attachments/Brexit_and_the_pharmaceutical_industry_1469784623.pdf. [Accessed 25th May 2017].

European Movement International, 2017. The consequences of a British exit from the European Union. Available from: https://www.aegee.org/wp-content/uploads/EMI_16_PolicyPosition_Brexit_17_VIEW_FINAL.pdf. [Accessed 15th May 2017].

European Union Committee 2016-17. Brexit: trade in non-fiancial services. Available from: https://www.publications.parliament.uk/pa/ld201617/ldselect/ldeucom/135/135.pdf. [Accessed 27th May 2017].

Global Counsel 2015. Brexit: the impact on the UK and the EU. Available from: https://www.global-counsel.co.uk/sites/default/files/special-reports/downloads/Global%20Counsel_Impact_of_Brexit.pdf. [Accessed 15th May 2017].

Grant Thornton 2016. The impact of 'Brexit' on the financial services sector. Available from: http://www.grantthornton.co.uk/globalassets/1.-member-firms/united-kingdom/pdf/Brexit-impact-financial-services.pdf. [Accessed 15th May 2017].

Gudgin, G., Coutts, K., & Gibson, N. 2016. The macro-economic impact of Brexit: using the CBR macro-economic model of the UK economy (UKMOD). Available from: https://www.cbr.cam.ac.uk/fileadmin/user_upload/centre-for-business-research/downloads/working-papers/wp483revised.pdf. [Accessed 15th May 2017].

Head, K., & Mayer, T. 2015. Brands in motion: how frictions shape multinational production. CEPR Didscussion Paper No. DP10797.

HM Treasury, 2016. HM Treasury analysis: the long-term economic impact of EU membership and the alternatives. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/517415/treasury_analysis_economic_impact_of_eu_membership_web.pdf. [Accessed 22nd May 2017]

IATA 2016. The impact of 'Brexit' on UK air transport. Available from: http://www.iata.org/publications/economic-briefings/impact-of-Brexit.pdf. [Accessed 15th May 2017].

Kierzenkowski, R., Pain, N., Rusticelli, E., Zwart, S. 2016. The economic consequences of Brexit: a taxing decision. Available from: https://www.oecd.org/eco/The-Economic-consequences-of-Brexit-27-april-2016.pdf. [Accessed 15th May 2017].

KPMG Economics Insights 2017. Brexit: the impact on sectors. Available from: https://assets.kpmg.com/content/dam/kpmg/uk/pdf/2017/03/Brexit-the-sector-impact.pdf. [Accessed 27th May 2017].

London First 2016. Leaving the EU: an assessment of its impact on services and trade. Available from: http://londonfirst.co.uk/wp-content/uploads/2016/06/Leaving-the-EU-impact-on-trade-June-2016.pdf. [Accessed 15th May 2017].

Manufacturing Technologies Association. Brexit priorities. Available from: https://www.mta.org.uk/sites/default/files/page/downloads/Brexit%20and%20the%20MTA.pdf. [Accessed 27th May 2017].

Moloney, N. 2016. Financial services, the EU, and Brexit: an uncertain future for the city?. German Law Journal, 17 . pp. 75-82. ISSN 2071-8322.

National Assembly for Wales 2016. Wales and the EU: what does the vote to leave the EU mean for Wales?. Available from: http://www.assembly.wales/Research%20Documents/16-037-Wales%20and%20the%20EU%20What%20does%20the%20vote%20to%20leave%20the%20EU%20mean%20for%20Wales/16-037-Leave-English.pdf. [Accessed 15th May 2017].

Ottaviano, G., Pessoa, J. P., Sampson, T., & van Reenen, J. 2014. The Costs and Benefits of Leaving the EU. CFS Working Paper Series, No. 472.

Portes, J., & Forte, G. 2016. The economic impact of Brexit-induced reductions in migration. Available from: http://gforte.weebly.com/uploads/8/6/2/8/86289108/25dec.pdf. [Accessed 15th May 2017].

PwC 2016a. Brexit monitor - the impact of Brexit on (global) trade. Available from: https://www.pwc.nl/nl/Brexit/documents/pwc-Brexit-monitor-trade.pdf. [Accessed 15th May 2017].

PwC 2016b. Leaving the EU: implications for the UK economy. Available from: https://www.pwc.co.uk/economic-services/assets/leaving-the-eu-implications-for-the-uk-economy.pdf. [Accessed 15th May 2017].

PwC 2016c. Brexit Monitor - the impact of Brexit on the automotive sector. Available from: https://www.pwc.de/de/automobilindustrie/assets/2016-11-15-Brexit-topic-automotive.pdf. [Accessed 25th May 2017].

PwC 2016e. Brexit monitor - the impact on pharma and life sciences. Available from: https://www.pwc.nl/en/Brexit/documents/pwc-Brexit-monitor-pharma-life-sciences.pdf. [Accessed 25th May 2017].

Van Reenen, J. 2016. Brexit 2016 – policy analysis from the Centre for Economic Performance. Available from: http://cep.lse.ac.uk/pubs/download/Brexit08_book.pdf#page=40. [Accessed 10th May 2017].

Wadsworth, J., Dhingra, S., Ottaviano, G., & Van Reenen, J. 2016. Brexit and the Impact of Immigration on the UK. Available from: http://cep.lse.ac.uk/pubs/download/Brexit08_book.pdf#page=40. [Accessed 10th May 2017].

Wales Governance Centre 2016. Wales and the EU referendum: estimating Wales' net contribution to the European Union. Available from: http://sites.cardiff.ac.uk/wgc/files/2016/05/Estimating-Wales'-Net-Contribution-to-the-European-Union.pdf. [Accessed 10th May 2017].

Welsh Government 2017. Securing Wale's future – transition from the European Union to a new relationship with Europe. Available from: https://beta.gov.wales/sites/default/files/2017-01/30683%20Securing%20Wales%C2%B9%20Future_ENGLISH_WEB.pdf. [Accessed 15th May 2017].

Woolford, J., & Hunt, J. 2016. Wales and the EU – agriculture and food. Available from: http://sites.cardiff.ac.uk/wgc/files/2016/07/AGRICULTURE.pdf. [Accessed 15th May 2017].

4 Wales and the EU: Trade, Investment and Human Capital

4.1 Introduction

This section provides some further context on Wales' economic connections to the European Union. These connections include those which arise though trading relationships (exports and imports), investment flows (particularly inward investment from the EU into Wales) and through employment of workers from the European Union. The aim of this section is to use available information to draw some conclusions on sectors which are at most risk from EU transition, and to highlight further data that will be required during the transition phase to facilitate decision-making by the Welsh Government and others.

4.2 Trade

This section will outline the data sources for Welsh trade data, and the key information gaps. This will be followed by a summary of recent trade trends, and potential WTO tariff that may be linked with the main trading sectors.

Information sources

Table 4.1 shows the information which is available for Wales from published official sources. The table also provides information on the source and frequency of the data, together with some comments on methodology, completeness etc.

Data on the value of overseas exports and imports of goods from/to Wales is provided by Her Majesty's Revenue and Customs (HMRC) on a quarterly basis. The data is available by standard trade classification (SITC) code, and by country area destination/origin of goods. There is a long time series of data available. However due to methodological developments the most recent data (from 2013 onwards) is more reliable/consistent. This data, whilst useful in relation to direct external trade, does not measure the value of exports/imports which may be via UK companies. Such trade is likely to be of some financial scale, but also has significance in terms of the implication of EU transition, such that Welsh companies may indirectly be affected by tariff or non-tariff barriers.

A more recent addition to the trade information is data relating to the value of services exports. This data is compiled using a range of information sources (see Table 4.1) and are classified as experimental statistics as they are still in the developmental stage in terms of methodology. This data is available by functional category (sector) but not by geographical destination. As yet no such data exists for service sector imports to Wales.

Information on the number of exporters and importers is available from the HMRC and from the Office for National Statistics (ONS) (via the Annual Business Survey). These sources use different methodologies to allocate exporters/importers to the regions (see Table 4.1), hence these figures can only provide a guide to the 'true' figure. However for the purposes of the analysis in this report, the whole number method used by HMRC is likely to provide the most useful guide the exporter/importer business count in Wales.

Table 4.1: Trade information for Wales from published official statistics

Data	Source and frequency	Comments
Value of exports and imports of goods by country and product.	HMRC, quarterly, latest release 8th June 2017, containing data for 2017Q1.	Only direct exports/imports of goods. Does not account for goods exported/imported via UK companies (indirect exports/imports). Value of exports and not value-added – which will vary significantly by sector/firm.
Value of service exports from Wales by functional category.	Sources: UK Balance of Payments - The Pink Book; International Trade in Services, ONS. Annual data, latest release 11th May 2017 containing provisional data for 2015. Time series available from 2011.	Experimental estimates. Several indicators used to apportion national estimates to regions. Value of exports and not value-added – which will vary significantly by sector/firm. Work is ongoing at ONS to provide estimates by country or continent destination.
Number of exporters and importers of goods and/or services (business counts)	Annual Business Survey, ONS. Annual data, latest release 10th November 2016, containing data for 2015.	Experimental official statistics. Covers all VAT registered businesses. The method involves apportioning out a trade status of an enterprise to its local units based on employment. While

		labelled as business counts, the counts relate to reporting units.
Counts of exporters and importers.	HMRC, quarterly, latest release 8th June 20 - 17, containing data for 2017Q1	Information is available using a whole number method (a business counts as 1 in each region they have employees) and using a proportion method (where each business counts as 1, subdivided across all regions based on the number of employees in each region).

Exports and imports

Table 4.2 shows HMRC data on the number of exporters in Wales, using the different methodologies. Using the whole number method, the average count over the three year period shown is 5,185, compared with 3,734 using the proportion method. The data provided by the ONS, is comparable to the latter figure, with this also using a proportion method. The figures in Table 4.2 have been relatively stable during the period shown, and with the number of EU exporters exceeding the numbers exporting to non-EU countries. It should be noted that many companies will export to both EU and non-EU countries, and are then only counted once in the total figure in Table 4.2.

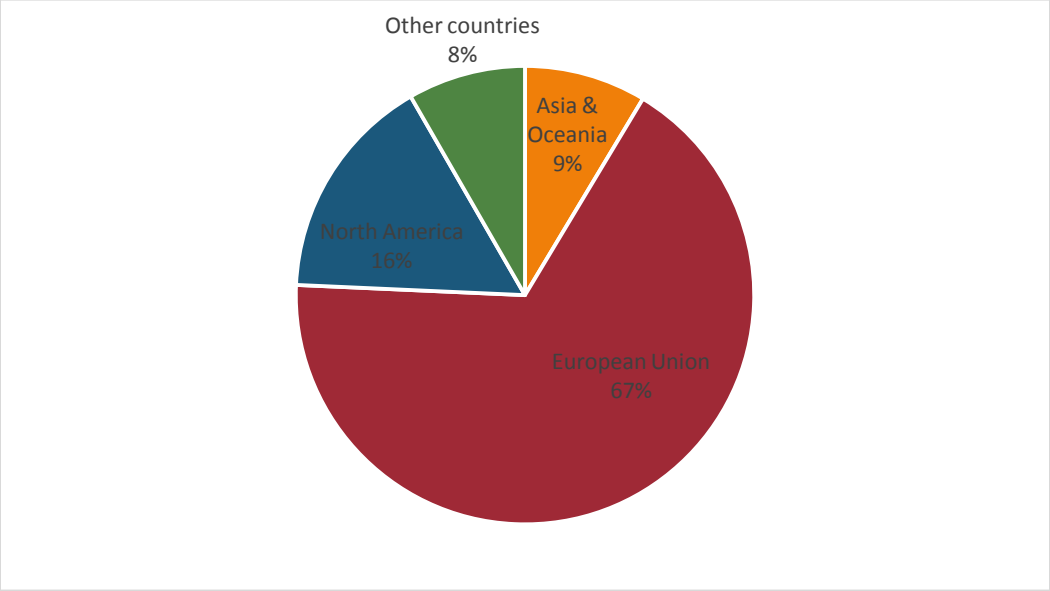
Table 4.2: Count of Exporters of goods from Wales

	Whole number Method			Proportion Method		
	2014	2015	2016 *	2014	2015	2016*
EU	4,178	4,182	4,275	3,120	3,112	3,197
Non-EU	2,986	2,985	3,027	1,766	1,767	1,813
Total	5,159	5,131	5,265	3,705	3,682	3,816

*Provisional data subject to update: Notes: See Table one for methodologies. The counts for businesses exporting to the EU and counts for businesses exporting to non-EU countries do not sum to the total business counts. Businesses that are active in both EU and non-EU markets are counted once only in the total business counts.
Source: HMRC

The importance of EU trade is further shown in Figure 4.1, which provides a breakdown of Wales' main export markets in 2016. The EU share of exports of goods from Wales has increased slightly from almost 63% in 2013 to just over 67% in 2016, whilst the value of total exports has remained fairly stable at around £12bn. After the EU (£8.3bn), North America, and Asia and Oceania are the next most significant markets, accounting for 16% (almost £2bn) and 9% (just over £1bn) respectively of exports from Wales in 2016.

Figure 4.1: Exports of goods from Wales by country group, 2016*, %.



*Provisional data subject to update. Source: HMRC

Table 4.3 provides a breakdown of exports from Wales by broad commodity groupings. The final column of the table shows the percentage of trade which is to the EU. Whilst the total value of exports has been fairly stable over the period shown, there have been some more significant changes in the distribution of exports. Exports of mineral fuels fell from £2.8bn in 2013 to around £1.5bn in 2016, linked to the closure of the Murco oil refinery. This decline has been almost exactly offset by an increase in exports of machinery and transport. The increases in exports of machinery and transport are almost entirely due to the increase in 'other transport equipment' (SITC group 79) which includes 'Aircraft and associated equipment'. The most significant increases in these exports have been in 2015 and 2016. Whilst the 2016 data is still provisional, this highlights the significance of these exports from Wales.

Exports of motor vehicles and parts (SITC group 78) have also increased, although less significantly, over the period, from around £450m in 2013 to £544 in 2016. The largest increase (of more than £100m) was during 2016, again these figures should be treated with some caution.

The other main change in exports is in manufactured goods, where the value has fallen from almost £2.2bn to around £1.9bn during the period shown in Table 4.3. This decline is largely due to a fall in exports of iron and steel from £1bn in 2013 to £435m in 2016, with the most significant decline during 2016 coinciding with the latest crisis in the UK steel industry (and also reflecting expected volume and value effects). The decline in exports of manufactured goods has been approximately balanced by increases in exports of chemicals and miscellaneous manufactures.

Table 4.3: Exports of goods by SITC Section, 2013-2016, £m

SITC Group	2013	2014	2015	2016*	*EU% 2016**
0 Food and Live Animals	253	237	234	283	*81*
1 Beverages and Tobacco	80	60	62	72	*39*
2 Crude Materials	254	296	229	240	*23*
3 Mineral Fuels	2,847	2,074	1,535	1,494	*41*
4 Animal and Vegetable Oils	10	9	10	9	*44*
5 Chemicals	1,336	1,358	1,354	1,471	*59*
6 Manufactured Goods	2,193	2,454	2,185	1,885	*66*
7 Machinery and Transport	4,308	4,142	4,789	5,653	*80*
8 Miscellaneous Manufactures	1,075	1,173	1,133	1,212	*56*
9 Other commodities nes	43	41	82	86	*87*
Total Exports	**12,398**	**11,843**	**11,612**	**12,405**	***67***

*Provisional data subject to update
Source: HMRC

Table 4.4 shows the value of services exports from Wales. As noted in Table 4.1, these are experimental statistics compiled by the ONS using a variety of sources. Total services exports in 2015 were £4.5bn, compared with goods exports of £11.6bn. Manufacturing, insurance, pension and financial services are the largest services exports from Wales, but with significant services exports of travel, transport, information and communication, professional and business services.

Table 4.4: Value of service exports from Wales by functional category, 2011 to 2015, £m

Functional category	Value of service exports				
	2011	2012	2013	2014	2015
Primary and utilities (agriculture, mining, utilities)	8	..	19	19	18
Manufacturing	684	958	909	1,151	1,037
Transport	572	469	588	377	429
Travel	411	447	448	483	561
Construction	30	16	12	28	10
Wholesale and motor trades	62	67	91	47	29
Retail (excluding motor trades)	25	27	28	30	22
Information and communication	193	202	158	318	268
Real estate, professional, scientific and technical	150	158	260	205	209
Insurance and pension services	838	1,113	1,194	1,162	937
Financial	859	958	930	829	946
Administrative and support services	30	30	62	35	54
Public admin, health and education; arts, entertainment and recreation; other services	1	..	2	6	6
Total in all categories	**3,862**	**4,475**	**4,700**	**4,689**	**4,527**

Source: ONS

Table 4.5 shows imports of goods to Wales by commodity. Total imports of goods into Wales have tended to exceed imports, but with the 2016 figures showing exports and imports which are approximately equal. As with exports, mineral fuels and machinery and transport are the largest import groups shown in the table. Imports of mineral fuel are however largely not from the EU. In terms of EU imports by value, machinery and transport products is the highest, followed by manufactured goods and chemicals. Whilst the value of exports and imports are similar, exports of goods to the EU exceed imports of goods. In 2016 imports of goods from the EU were just over £6bn. With no available information of the value of services imports to Wales, and with the value of indirect exports and imports unknown, it is not possible to estimate the balance of trade for Wales using published sources.

Table 4.5: Imports of goods by SITC code, £m.

	2013	2014	2015	2016*	2016 EU%*
0 Food and Live Animals	597	593	633	620	84
1 Beverages and Tobacco	128	129	124	130	90
2 Crude Materials	1,111	1,004	743	746	48
3 Mineral Fuels	3,793	3,895	2,475	2,169	12
4 Animal and Vegetable Oils	28	24	21	21	76
5 Chemicals	1,242	1,388	1,293	1,331	63
6 Manufactured Goods	1,549	1,765	1,682	1,667	63
7 Machinery and Transport	4,056	4,082	4,269	4,157	53
8 Miscellaneous Manufactures	1,417	1,492	1,508	1,590	42
9 Other commodities nes	12	16	24	28	96
Total Imports	**13,934**	**14,387**	**12,772**	**12,460**	**49**

*Provisional data subject to update.
Source HMRC

Welsh overseas exports of goods and potential WTO tariffs

Table 4.3 earlier summarised exports by main commodity group. Table 4.6 provides a more detailed analysis of the value of exports, for the latest year available (2016, and still provisional), together with the Harmonised System (HS) codes that provide internationally standardised codes and descriptions for traded products, and the linked estimated expected WTO tariffs that could apply under a hard Brexit scenario. Whilst this table provides more detail that Table 4.3, the HS codes used to assign tariffs are much more highly detailed, such that only an indication of potential tariff ranges can be provided in Table 4.6, using 2 digit HS codes. Where the more detailed code is useful, and/or where the particular Welsh exporting product can be matched in more detail to the HS code, then this information is provided in the notes to Table 4.6.

Table 4.6: Welsh exports of goods and possible WTO tariffs

SITC Code	Description	Export value 2016, £m	HS code	Average Tariff range, %	Notes
00	Live animals other than animals of division 03	4.9	01, 05	0.1-1.2	
01	Meat and meat preparations	73.1	02, 16	5.1 - 18.2	HS 16 includes preparations of meat which attract much higher tariffs
02	Dairy products and birds' eggs	46.3	04,	5.3	This HS code includes dairy (zero tariff), eggs (7.7 % tariff) and natural honey (17.3% tariff)
03	Fish, crustaceans, molluscs and aquatic inverterbrates and preparations thereof	25	03, 16	11.1-18.2	HS 16 includes preparations of fish which attract much higher tariffs
04	Cereals and cereal preparations	46.6	10, 11, 19	2.2 - 12.2	The lower tariffs are for cereals, and the higher end is for prepared products.
05	Vegetables and fruit	8	07, 08, 12, 13, 14, 20.	1.2-17.5	The higher tariffs are for prepared fruit/veg products.
06	Sugar, sugar preparations and honey	3.1	17, 18	6.1 - 8.8	
07	Coffee, tea, cocoa, spices and manufactures thereof	12.3	09	2.3	
08	Feeding stuff For animals (not including unmilled cereals)	12	23	8	
09	Miscellaneous edible products and preparations	51.4	15, 21	5.4 - 9.2	
0	**Food and live animals**	**282.7**		0-18.2	
11	Beverages	71.6	22	3.9	
1	**Beverages and tobacco**	**71.6**			
2	**Crude materials, inedible, excl. fuels**	**240**	40, 44, 45, 47	0 - 2.7	This HS code includes natural products and prepared/processed products. Natural/simply prepared wood/cork/rubber has zero tariff.
3	**Minerals, fuels, lubricants etc.**	**1494.1**	27	0.8	
4	**Animal and vegetable oils etc.**	**9.2**			
5	**Chemicals and related products**	**1471.5**	28-35, 38-39	0 - 6	Pharmaceutical products, zero tariffs, plastics, 6%, organic/inorganic chemicals average is 4.4%
61	Leather and leather products	1.1	41-43	2 - 4.6	
62	Rubber manufactures not elsewhere specified	119.4	40	2.6	
63	Cork and wood manufactures (excluding	7.7	44, 45	2.7 - 2.2	

	furniture)				
64	Paper and paperboard	180.9	48, 49	0	
65	Textile yarn, fabrics, made up articles etc.	46.7	50 - 63, 65	2.8 - 10.2	
66	Non-metallic mineral manufactures not elsewhere specified	157.7	25, 68 – 70	0.2 - 5	
67	Iron and steel	435.3	72, 73	0.3 - 1.7	HS 72 is iron and steel, 0.3%, HS 73 is articles of iron and steel, 1.7%
68	Non-ferrous metals	664.2	74 - 76, 78 – 81	0 - 6.4	HS 76 is Aluminum, 6.4%
69	Manufactures of metal not elsewhere specified	272.6	82, 83	2.5 - 3.1	
6	**Manufactured goods**	**1885.5**			
71	Power generating machinery and equipment	222.7	84	1.8	
72	Machinery specialized for particular industries	238.2	84	1.8	
73	Metalworking machinery	53.4	84	1.8	
74	General industrial machinery and equipment and machine parts not elsewhere specified	246	84	1.8	
75	Office machines and ADP machines	193.4	84	1.8	
76	Telecomms and sound recording and reproducing apparatus and equipment	115.4	85	2.8	
77	Electric machinery, apparatus and appliances and electric parts thereof not elsewhere specified	571.6	85	2.8	
78	Road vehicles	544.6	87	5.8	The more detailed HS codes relating to car parts/accessories - tariff range is 3.7- 4%
79	Other transport equipment	3467.3	86 – 89	1.1 - 3.3	HS 88 is aircraft, spacecraft and parts, 3.3%
7	**Machinery and transport equipment**	**5652.5**			
81	Prefabricated buildings; sanitation , plumbing, heating and lighting fixtures	21.8			
82	Furniture and parts thereof; bedding and mattresses etc.	298.9	94	2.3	
83	Travel goods, handbags and similar containers	10.4			

84	Articles of apparel and clothing accessories	99.5	61, 62	11.3 - 11.7	
85	Footwear	25.9	64	11.1	
87	Professional, scientific and controlling Ins and apparatus not elsewhere specified	301	90	2.2	
88	Photographic and optical goods not elsewhere specified; watches and clocks	59.5	37, 91	4.2, 5.5	
89	Miscellaneous manufactured articles not elsewhere specified	394.8	92, 93, 95 – 97	0 - 3.3	
8	**Miscellaneous manufactured goods**	**1211.8**			
9	**Commodities not classified elsewhere**	**85.7**			
	Total	12404.7			

Source: Derived from WTO and HMRC Export data (2016 data is provisional).

Table 4.6 shows the most detail available by SITC code for the value of Welsh exports of goods. The first section shows the details for the food and live animals products group. A number of the products listed in this group are relatively small in terms of export value. Overall for this group the possible tariffs range from zero to 18.2% on prepared meat and fish products. In general for this group of products, the tariffs are considerably higher for prepared/processed food, compared with unprocessed/raw products. The tariffs for beverages average 3.9, and are classified in HS code 22.

For some Welsh companies in the food and drink sector, the WTO tariffs on some /all of their products are likely to be zero. However for other companies, for example those involved in producing processed food products, then the potential tariffs are considerably higher. Many firms within this group would likely have multiple different tariffs on any products which are exported. For example, there are zero tariffs on unprocessed meat products, but 13-15% tariffs on meat products, sausages etc.

There is no further disaggregation of the exports of products within SITC codes 1 – 5. SITC 2 products, crude materials, inedible (excluding fuels) generally comprise unprocessed (or lightly processed products) in similarity to food products these have lower tariffs than articles and products that are made from wood, rubber etc. Whilst the relevant 2 digit codes have tariffs that range up to 2.7%, the specific HS codes for the crude materials have a tariff of zero.

Mineral fuels are included in HS code 27. Whilst this is a large export for Wales by value, a relatively small proportion is to the EU (12% see Table 4.5), and the average tariff is 0.8%.

The chemicals and related products SITC group contains a number of products ranging from organic and inorganic products to pharmaceutical products, soaps and plastics. Within the group the average tariffs vary from zero, for pharmaceutical products, to 6% for plastics. The average tariff for organic and inorganic chemicals is 4.4%.

There is some detail on the products included within 'manufactured goods' in Table 4.6. Of those listed, the most significant exports in 2016 were in non-ferrous metals, and iron and steel. In the non-ferrous metals group, most of the HS codes have relatively low or zero tariffs, with aluminum and aluminum articles attracting the higher end tariff of 6.4%. Within the iron and steel sector, iron and steel tariffs are 0.3% (with recycled steel at zero tariff), with articles of iron and steel higher at 1.7%. The products of other metal manufacturers have average tariffs ranging from 2.5%- 3.1%. Other significant products exported in this group include paper and paperboard and non-metallic mineral manufactures.

Machinery and transport (SITC code 7) had the highest exports in 2016, with more than 60% (almost £3.5bn) of these exports in SITC 79 (other transport equipment). The average tariff range for this group is 1.1%-3.3%. The other products exported within the machinery and transport group include 'road vehicles' and 'electric machinery, apparatus and appliances and parts'. Whilst the average tariff for 'road vehicles' is 5.8% the more detailed HS codes relating to parts/components, are slightly lower and range between 3.7%-4%. As large and medium sized firms operating in this sector in Wales manufacture components or engines, the tariffs that will apply directly are more likely to be in the 3.7-4% range as opposed to, for example, 9.7% for a finished vehicle (HS code 8703). Electric machinery etc. products are included within HS code 85, which have an average tariff of 2.8%.

Average tariffs are lower for other products within the machinery and transport equipment group. For example SITC codes 71-75 are included with HS code 84, which has an average tariff of 1.8%.

Of the remaining groups of products classified in 'miscellaneous manufactured goods' two groups are of particular interest in relation to the value of their exports. According to the HMRC data, exports of furniture were almost £300m in 2016. The relevant HS code for furniture products is 94 and the average tariff is 2.3%. The other group of products are professional, scientific and controlling instruments and apparatus. The average tariff for this group is 2.2%, although for some companies within this group their specific HS codes may have zero tariffs.

4.3 Inward Investment

This section will briefly outline recent trends in inward investment at the global, national and regional level. Information on the possible impacts of EU transition will then be considered within the context of these trends. Wales has traditionally been one of the more successful regions in terms of the UK share of projects and associated jobs attracted when compared to its population share. Any impacts from EU transition which may negatively affect FDI flows into Wales, or which may result in dis-investments/relocations away from Wales could therefore have potentially serious implications for Welsh economy.

UK Inward Investment trends

Information regarding inward investment flows and stocks in the UK are available from a number of sources. For example at the international level, data for the UK is available within publications such as the United Nations Conference on Trade and Development (UNCTAD's) *World Investment Report* (WIR). This is published annually and contains data on foreign direct investment flows and stocks by value, type and by country. Within the UK, the main published source of information is the Department for International Trade, which publishes annual data on the number of new inward investment projects and jobs by region.

Table 4.7 shows UNCTAD data for FDI inflows for the UK and the EU. The first column provides an annual average for 2005-2007 to reflect pre-credit crisis levels. The FDI inflows in the UK and the EU were well below this average in 2013 to 2015, with the EU still below this average rate in 2016. However FDI inflows into the UK increased sharply in 2016, largely accounted for by the completion of cross border merger and acquisition (M&A) 'megadeals'. According to UNCTAD 'three of the four largest deals in the world completed in 2016 were foreign acquisitions of companies based in the UK' (UNCTAD, WIR, p.72). This inflow placed the UK in second position (behind the US, and above China) in terms of FDI inflows in 2016 (in contrast to its 14th position in 2015).

Pre-financial crisis, the UK accounted for over 27% of EU inward investment. However in the years after the crisis shown in Table 4.7, the UK share was much lower, and decreased in 2015 to less than 7%. The recent M&A inflow, with a number of large deals completed in the same year, adds some difficulty when trying to establish trends. In contrast, UNCTAD data on the value of announced greenfield investment projects into the UK showed a decline in 2016. The *WIR* noted that the deals completed during 2016, were announced in previous years, and that the impact of Brexit on FDI plans would take some time to translate into flows. The report suggests that such deals are less influenced by the domestic policy environment as these target companies are global multinational enterprises (MNEs) whose revenues are less likely to be affected by Brexit.

UNCTAD note that sectors more likely to be affected include financial services and those companies who form part of European value chains, such as the automotive industry. In UNCTAD's most recent business survey of MNE executives, the US and China held their positions as top prospective host economies, whilst the UK fell from 4th position in 2015, to 7th in 2016 'possibly owing to uncertainty about Brexit'.

Table 4.7 Foreign direct investment inflows, $m, UK and EU.

Year	2005-2007(pre-crisis annual average)	2013	2014	2015	2016
UK	169,046	51,676	44,821	33,003	253,826
EU	614, 125	336,811	256,613	483,839	566,234
UK/EU %	27.5	15.3	17.5	6.8	44.8

Source: UNCTAD, WIR, 2017

The most recent data on the number of projects in the UK, relates to the tax year 2016-17, and is published by the Department for International Trade. Table 4.8 shows the number of projects by type, from 2011-12 to 2016-17. This most recent data show an increase in the numbers total projects, due to new investments. Expansions and M&As fell in this latest period, although as noted above, there was an increase in M&As during 2016, which cross the accounting periods shown in Table 4.8. Whilst the number of projects increased by 2%, the number of new jobs created fell by 2%.

Table 4.8 Types of Inward Investment, UK, 2011/12 – 2016-17.

Types of investment	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	15/16 – 17/17 change
New investments	752	777	820	1,058	1,130	1,237	9%
Expansions	506	577	677	740	821	782	-5%
Mergers and acquisitions (including joint ventures)	148	205	276	190	262	246	-6%
Total projects	1,406	1,559	1,773	1,988	2,213	2,265	2%
New jobs created in the UK	52,741	59,153	66,390	84,603	82,650	75,226	-9%

Source: Department for International Trade.

Inward Investment to Wales

Table 4.9 shows Wales' recent inward performance in terms of projects and jobs as recorded by UKTI/Department of International Trade. In 2014/15 and 2015/16 there were more than 5,000 jobs created by around 100 projects each year. For these two years Wales attracted around 5% of the UK's new projects and around 6% of the new inward investment jobs. In 2016-17 a larger number of over 11,500 jobs were associated with inward investment into Wales but with most of these safeguarded by new investment as opposed to new employment.

Table 4.9 Inward investment, projects and new jobs, Wales, 2008/09 – 2016/17

Year	Projects	New Jobs	Safeguarded Jobs	Total Jobs
2008/09	60	2,185	529	2,714
2009/10	65	3,431	3,931	7,362
2010/11	38	2,444	1,100	3,544
2011/12	23	1,838	1,016	2,854
2012/13	67	2,605	4,442	7,047
2013/14	79	2,726	7,715	10,441
2014/15	101	5,085	4,520	9,605
2015/16	97	5,443	1,534	6,977
2016/17	85	2,581	8,965	11,546

Source: UKTI, and Department for International Trade.

There is no published time series information on inward investment into Wales by sector. Welsh Government data, aggregated for the period April 2012-March 2016, is shown in Table 4.10. The number of inward investment projects in Wales over this period was 344, and these were linked with almost 34,500 jobs. These jobs figures will include new as well as safeguarded jobs.

According to Table 4.10, one third of the projects, and almost 40% of jobs were in the advanced materials and manufacturing sector, with ICT the next most significant in terms of projects (18%), but with financial and professional services the next highest in terms of jobs (almost 18%). On average each FDI project supports 100 jobs.

4.10 Sector Breakdown - All FDI Projects into Wales (April 2012 to March 2016)

Sector	Projects	% Projects	Jobs	% Jobs
Advanced Materials & Manufacturing	116	33.72	13,502	39.22
Construction	2	0.58	1,069	3.10
Creative Industries	7	2.03	173	0.50
Energy & Environment	36	10.47	4,606	13.38
Financial & Professional Services	41	11.92	6,134	17.82
Food	14	4.07	1,070	3.11
ICT	63	18.31	4,133	12.00
Life Sciences	57	16.57	2,428	7.05
Other	8	2.33	1,314	3.82
Total	344	100	34,429	100

Source: Welsh Government

Table 4.11: Country/area breakdown - all FDI projects into Wales (April 2012 to March 2016)

Country/Area	Projects	% Projects	Jobs	% Jobs
EU 27	**103**	**30**	**16,417**	**48**
USA	131	38	9,279	27
Japan	26	8	1,425	4
Canada	21	6	2,113	6
India	11	3	1,436	4
Other	52	15	3,759	11
Total	**344**	**100**	**34,429**	**100**

Source: Welsh Government

Table 4.11 shows that 30% of projects and almost 50% of inward investment jobs in Wales were associated with investments from the EU. The US accounted for more projects than the EU, but with less jobs. There is no data available to link the sectors to the country of origin, however from the information in Tables 4.10 and 4.11, the projects originating in the US are less labour intensive, suggesting they are in the more productive and capital intensive parts of the sectors in Table 4.10.

Even with the limited information which is available, the data in the Tables 4.10 and 4.11 show the scale of inward investment into Wales, and the possible impacts, in terms of investment and jobs that could be at risk during EU transition. For example, the largest inward investment sector, advanced materials and manufacturing, although very broad, incorporates high exporting sectors which are of high potential tariff and non-tariff risk (see later). In addition, and following from the commentary in the *WIR* (2007), some MNE executives are now considering the UK to be a less desirable host location, and this will have implications for future FDI flows to Wales.

4.4 Labour markets/EU workers in Wales

One of the risk factors relating to EU transition relates to the use of EU workers within the region, and the potential impacts of reductions in free movement of labour within the EU. These impacts are likely to vary considerably by sector, and by firms within each sector. In addition, this risk factor (see later) has added complexities due to the different types of labour firm's demand. For example, for some firms, the issue relates more closely to the ease of access to specialised skills, or the transfer of personnel within corporate groups.

There is a general lack of published information on the nationality of the workforce by sector. Some indication of the number of workers by sector, nationality and region can be derived from the Annual Population Survey. The data in Table 4.12 provides a three year average (2013-15) for workers by nationality classified as UK, EU and non-EU. The sectors in Table 4.12 are highly aggregated, and data is not available for Wales for most of the sectors listed. Only limited inference can be drawn from the UK data, as in all cases where data for Wales is available, the share of EU workers by sector in the UK is considerably higher than in Wales. Overall, 5.7% of workers in the UK have an EU nationality, compared with 2.8% for Wales.

Table 4.12: Number of workers (employees and self-employed) in each industry sector by nationality group, Wales and UK, 2013-15, 000s

	Wales					United Kingdom				
Sector	**UK**	**EU**	**Non-EU**	**Total**	**EU%**	**UK**	**EU**	**Non-EU**	**Total**	**EU%**
Agriculture, forestry and fishing	24	c	c	24	Na	260	19	c	282	6.9
Energy and water	27	c	c	28	Na	494	21	15	530	4.0
Manufacturing	136	10	c	147	6.7	2,516	252	82	2,851	8.8
Construction	90	c	c	91	Na	1,925	141	43	2,110	6.7
Wholesale and retail trade, hotels etc	237	8	5	250	3.4	4,748	393	260	5,402	7.3
Transport and communication	74	c	c	77	Na	2,304	161	142	2,607	6.2
Financial and business services	143	4	c	149	2.5	4,331	300	217	4,849	6.2
Public admin, education and health	418	8	7	433	1.8	8,191	291	320	8,803	3.3
Other services	66	c	c	68	Na	1,468	87	63	1,619	5.4
Total	1,218	35	19	1,272	2.8	26,317	1,672	1,150	29,145	5.7

Source: ONS, Annual Population Survey three year pooled dataset. Region is the region of the place of work, not the region of residence. "c": Data unavailable due to small sample size (<31)

https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/datasets/internationalmigrationandthelabourmarketukregionaldata

In both the UK and Wales, compared with the overall average, the share of EU workers is much higher in the manufacturing sector, and is lower in the public sector. Wholesale, retail, hotels etc. also have relatively high shares of EU workers. Of total workers in financial and business services in the UK, just over 6% are EU workers, compared with 2.5% in Wales.

In summary, Wales has a relatively low share of EU workers. Access to volumes of EU workers may be important to a limited number of large and medium sized firms in Wales. For these firms, consultation evidence reveals that where labour markets risks from EU transition do exist, that this risk factor is significant. However the characteristics of many large and medium sizes firms in Wales suggests that either the access to quality of skills is more important, or that this is not a particular high risk factor.

4.5 Concluding comments: Information gaps

The discussion in this chapter has centred on trade (exports/imports), inward investment and labour use by sector and over time. Any analysis of this type is limited by the information available. Each section has noted information gaps – where potentially useful information, relating to EU transition and impacts, is not published. Table 4.15 provides a summary of these information gaps, and an indication of how important these gaps are indicated by a priority rating of high, medium and low.

Table 4.12 Main information gaps

Gap	Why useful	Priority
Services imports to Wales	To provide a more complete account of export and import activity by sector. Information on the reliance of Welsh firms on imported services.	Medium/low
Inter-regional trade	To provide a more complete account of export and import activity by sector by providing 'indirect' trade. Will help to more fully assess impacts of EU transition via UK firms.	High
Inward investment time series data by more detailed sector/origin.	To provide a better understanding of trends for monitoring purposes. MNE decisions particularly sensitive to uncertainty and access to EU market/tariffs.	High
Skills demands/use by nationality and selected sector.	To provide a better understanding of the potential labour market impacts of EU transition on selected sectors/firms.	Medium

5 Consultations

5.1 Introduction

Welsh Government led on a series of consultations with businesses in Wales, the majority of which were either Anchors or RICs. A summary of the firms responding is found in Table 5.1. This does not include further information derived from roundtable events at CBI and South Wales Chamber of Commerce meetings during June 2017. This latter process resulted in more limited responses from a further 20 firms and institutions[4]. This overall process led to the collection of a great deal of information on individual firms, some of which informed the conclusions made on individual sectors later in this report. However, the focus in this section is on what respondents in firms said about the short and long term consequences of the EU transition process. Although the focus of the consultations was with Anchors and RICs many of the conclusions from the consultations are expected to be relevant to other large firms in the selected sectors. The section opens with general points and conclusions from the consultation process before focusing on specific points made with respect to firms in individual sectors.

Before this it is important to note the difficult context of consultation process. First it was undertaken when the negotiating position of the UK was fluid: thus, the spirit of the consultation was to ask firms about the consequences of present uncertainty, and then problems that would be created in a hard Brexit WTO approach. Second, given the short time period, it was only possible to cover a sample of large and medium sized firms, many of which were Anchors and RICs. Some care is then needed in generalising from the findings to wider sectors. Indeed, very clear from the analysis, was that even within the same sectors that concerns about Brexit varied widely.

[4] Of these 20, and in terms of the classifications in Table 5.1, 3 were in other advanced manufacturing and engineering, 1 in paper, wood and wood products, 2 in food and drink, 4 in financial services (although small firms), 1 in automotive, transportation and related. The remainder professional services (3), retail (1) or tourism facing firms (1) not included in the sectors used in this report. A further two were unspecified sectors, and two were institutions (education/chambers of commerce).

Third, the amount of information that firms provided varied widely. In some cases comprehensive responses included completed Input-Output questionnaires that gave more detail on firm purchases and sales, and allowed stronger conclusions to be made about exposure to value added tariffs directly and indirectly. Finally, the individual firm have been anonymised as far as possible.

Table 5.1 Consultation responses

Sector	Responses to consultation
Aerospace systems and services	1
Automotive, transportation and related	1
Construction and civil engineering	1
Electrical engineering, electronic components, semiconductors	4
Energy & utilities	1
Financial services	2
Food and drink	2
Information and communications technology	2
Medical/health products and services	2
Other advanced manufacturing and engineering	6
Paper, wood, wood products	2
Process and chemicals	2
Steel	1
TV production and creative	2

Note: These are direct consultations undertaken in May-June 2017, undertaken specifically for this report, and does not include earlier consultations collected by sector teams nor consultations undertaken with wider industry fora/roundtables. There were no direct consultations undertaken with firms in business services, textiles, or insurance.

5.2 Overarching issues from the consultation

An overall appraisal of the individual firm responses revealed some overarching themes.

There was clear evidence that Brexit and the process of transition was already being factored into business decisions with economic ramifications for Wales. A persistent theme in responses was current uncertainty. Business decisions, with ramifications for the health of the regional economy will be made long before Brexit negotiations are concluded. Such decisions will be triggered by factors such as imminent property lease renewal, with this in one case triggering some retrenchment to other EU countries. With respect to manufacturing, a series of respondents gave examples of how they were currently in negotiations with parent organisations for investment for new product lines or new contracts for manufacturing, and that the impacts of future potential duties was a current consideration in such decisions.

As expected, those respondents most concerned about tariffs and free movement of labour/staff correspond with those where labour productivity is relatively high compared to the Welsh average (Other advanced manufacturing, Aerospace, Automotive). Particularly interesting was how respondents in selected manufacturing sectors contextualised their discussion of tariffs and free labour movement in comparison or contrast to parallel group production facilities elsewhere in the EU, and in some cases with these facilities already producing exactly the same or very similar goods.

A further point was that none of the respondents saw their Welsh operations as fully immune from EU transition processes and underlying uncertainty. The more vociferous comments on 'direct' EU transition effects came from manufacturing and process based sectors. However, even in sectors where domestic and ROW demands were more important, such as financial and professional services, TV production, paper, wood products sectors, there were concerns on how uncertainty would rebound into business and consumer confidence and credit availability.

The consultation process asked respondents about preparedness and planning for EU transition. In many cases, it was clear that decisions in respect to Welsh operations would be made elsewhere. This is less of an issue with consultees from firms which were more likely to be controlled from within Wales (selected RICs for example). This links to the long established issue of a branch plant economy, particularly where the decision nexus is elsewhere. Fundamentally, during EU transition it is branch plants that are expected to be more vulnerable and this was confirmed in the consultations. This will create a critical issue for Welsh Government in its Brexit response. So, for example, for one company a key issue was for Welsh Government to give confidence to decision-makers in Europe that the UK is still a good place to invest and by emphasizing sector deals, regional funding and R&D investment. However there are questions arising from the consultations on how far Welsh Government might be able to provide assistance and advice where decision-makers are more distant.

The consultation revealed that the specific and crux issues facing the more vulnerable firms were in fact very diverse. These ranged from issues on future tax reliefs, specific regulations on chemicals, access to specific goods and services, tariff levels etc.

Finally, an element of the consultations asked about opportunities in respect of EU transition. Few respondents (see below) were able to comment on any new opportunities presenting themselves as a result, for example, of a hard Brexit and trading on WTO rules.

There was a vast amount of material collected in the consultations. In what follows selected messages from the sector consultations and roundtables are distilled.

5.3 Aerospace systems and services

The consultation process with the Aerospace systems and service sector revealed:

- Less concern on tariffs because WTO duties on selected products made by the sector were considered to be low. Regulations were by far the largest area of concern, particularly around certification burdens and with this problem heightened because of complex value chains in the sector.
- That the process of EU transition was occurring at the same time as a period of reorganization for some firms in the sector.
- Strong concerns about the ability to participate in future EU research programmes, and the potential loss of influence that might result from EU transition. The wider aerospace sectors in the UK receive large sums from EU R&D programmes including Horizon 2020, Clean Sky, European Space Agency and Galileo/Copernicus and benefited from leveraging European assets to develop UK intellectual property.
- Free movement of labour was primarily an issue in terms of moving people around inside firms. Where UK employees are not able to travel at short notice then work could transition to non UK employees to undertake. This was highlighted as an issue in activity such as supporting new product introductions, working on minor or major product modifications, and resolving complex technical issues. The sharing of skills and resources between sites and countries had become a crucial factor in an ever-more competitive market, with ever-increasing specialist skills required in the sector. The need to develop those skills through international assignments and the need to deploy skills across national boundaries was viewed as critical in the sector.

5.4 Automotive, transportation and related

Outputs from the automotive components sector in Wales are part of complex global value chains. However, prospects are also strongly linked to vehicle production in the UK and with selected car makers such as Nissan already having recently committed to new investment. This is a sector which might suffer from both tariff and non-tariff (rules of origin) barriers. Under a hard Brexit tariffs could work to increase the costs of both sector imports and exports. One concern here is how tariffs might work to compromise some car production in the UK where EU-made components go into UK-produced cars which are subsequently exported back to the EU.

The consultation process here revealed:

- That selected plants in Wales were part of groups with other facilities in the EU, and often parts of the EU with lower labour costs, such that any developments that significantly raised costs in the UK would be viewed as a problem by group purchasing functions.
- For some Welsh plants many of the core components come from other parts of the EU.
- That some firms were in the midst of decisions on new investments, particularly engines, and that Brexit arrangements were viewed as crucial to whether Wales would win this type of new business.
- That a return to WTO rules could severely reduce profits of not just Welsh subsidiaries, but the UK arms of automotive and automotive component firms and with real uncertainty on whether firms might have to pay twice on importing components and then exporting components to other parts of the EU.

5.5 Construction and civil engineering

In large measure the Welsh large and medium sized firms involved in this sector serve domestic demand, and are domestically owned, but in some instances they partner with EU based firms to win large contracts. The consultation process highlighted the following points here:

- Concerns around how the EU transition process might impact upon domestic demand, and the stream of large civil engineering projects.

- Concerns around short term currency fluctuations, particularly, where equipment is sourced or leased from EU sources. Some parts of the wider UK sector also use large amounts of migrant labour, although this is less of an issue with the large and medium sized Welsh firms in the sector.
- That the EU was seen as very protective over trade in construction, and with some firms choosing not to tender for EU construction projects because of small chances of success, with contracts typically awarded to the member states' own firms, so that there is no value in putting any resource into tenders. In this respect there was seen to be an uneven playing field with the UK tending to interpret the rules very differently meaning it was easier for EU construction firms to get a hold in the UK rather than the other way around.
- With respect to use of EU staffs this was low in one consulted firm but with a recognition that general recruitment in the industry was a struggle. Without EU workers, broadly speaking, the industry would be in serious trouble.
- That if EU transition resulted in a higher reliance on non-EU markets this might mean that risk factors are higher when plant is purchased mainly from Europe.
- A firm consulted revealed that it did purchase equipment in the wider EU but in some instances this equipment was imported into Europe before being sold on. In this respect an issue raised was that parts for maintenance of construction equipment might carry high tariffs post Brexit.
- There were post Brexit opportunities for Welsh Government to look more carefully at procurement procedures and the ways projects are packaged up into subcontracts, such that there were more opportunities for local firm involvement.

5.6 Electronic engineering, electronic components and semiconductors

This is a broadly defined sector embracing elements of contract manufacturing of electronic goods and components set aside more complex activity in terms of semiconductor equipment and products. The main themes that came out a series of consultations with firms in the sector were as follows:

- For the contract manufacturers Brexit weighed heavily in their risk registers because free passage of their goods was vital, particularly where home appliance goods were sold on to other European manufacturers.
- Some respondents argued that joint R&D work with European producers could be affected by Brexit. Brexit might also impact collaborative work undertaken with EU

design houses and universities; ongoing collaboration and free movement related to this was important. Also noted were concerns on service packages and business ability to respond to EU clients quickly in a post-Brexit environment.

- One firm consulted had engaged in preparatory work particularly focusing on tax. There was a focus here on potential difficulties in terms of VAT recovery after Brexit.
- A second firm argued that they were not engaging with Brexit issues currently, due to the lack of clarity. Only once there was greater clarity would the firm begin to think about what (if anything) needed to be done, although with some initial work being undertaken on development strategies under different Brexit scenarios. In broad terms the firm was working on the assumption of a tariff free environment. However they were developing a more robust cost reduction program to better position themselves for future cost uncertainties. The firm was also investigating how it might use existing parent company manufacturing locations within the EU which may better position the company post Brexit.
- In general the foreign-owned elements of the sector tended to operate other facilities in the wider UK and the EU, and in some cases with EU facilities producing components that are complementary to those made in Wales.
- Parts of the contract manufacturing sector are more reliant on EU staffs than others.
- Some firms in the sector already paid tariffs on imported products from outside of the EU, this was often in terms of components from the Far East. One firm consulted argued that their trade was already impacted by certain non-tariff barriers, but these were unlikely to change following Brexit. The firm adhered to EU regulatory, certification and testing standards and would need to continue to do so in order to export to the EU. Post Brexit this was seen as potentially resulting in additional administration and delays in the supply of such products.
- One contract manufacturer made the point that issues such as compliance with regulations and protecting IP rested with their clients, although they believed that their EU clients were very worried about potential changes to the IP regime.
- Some large firms in the sector in Wales outwith the consumer electronics sector traded more globally with one respondent to the consultation arguing that they competed with US, Japanese and Taiwanese competition. This respondent did not consider itself directly affected by EU trade agreements as it traded globally, and did not believe that its customer base would be heavily affected. For these firms there were greater concerns over research and industry collaborations with EU firms and institutions and whether EU transition would lead to loss of influence to drive projects. Also in the higher value added parts of the sector using highly skilled

workforces, the biggest concern was in relation to labour and with any regulations impeding labour market movement a problem, particularly were Brexit to lead to more tightening of access to ROW labour markets.

5.7 Energy and utilities

The respondent here was a firm with power generation facilities in Wales, but with the firm operating widely across the EU. For this firm, the main priorities were continued UK participation in the internal energy market. There were also concerns raised over how the process of EU transition would affect participation in the EU Emissions Trading Scheme (ETS) which works to minimise cross-country carbon leakages. The firm provided energy across EU markets and there were issues raised around whether differential tariffs might work to make energy costs more important in some states. Finally, the firm had concerns over how the process of EU transition would affect its access to highly skilled labour, particularly in respect of IT, engineering and energy trading. Much of the firm's views over EU transition did not relate specifically to their operations in Wales.

5.8 Financial services

Financial services in Wales was a sector not expected to be affected by tariffs, and with firms consulted in this sector having clients overwhelmingly based in the UK. The consultations with firms here revealed:

- A main issue was loss of business and personal confidence following Brexit, and potential tightening of credit availability for Welsh based business. The uncertainties were principally tied up with negative Brexit impacts on the City which might manifest in lower levels of confidence in financial markets. There were challenges to ensure operations were well enough capitalised to withstand Brexit related economic shocks and potential resulting mortgage and loan defaults.
- Issues around free movement of labour were of little consequence, although with some concerns voiced for the UK sector in terms of loss of EU nationals from the City, and emphasis on the UK securing passporting of financial services. It was expected that only a few financial services firms in Wales would be directly affected by passporting and that these had existing European trading subsidiaries.

- Responding firms saw few significant opportunities resulting from the EU transition period, and were making representations through trade bodies supporting avoidance of trade barriers, the need for the UK Government to secure stability, and allow EU staffs to stay.
- It was expected Welsh Government could actually do little for the sector in Wales because it did not have the capacity to influence the factors that drive the national and international supply and demand for capital.
- One firm dealing with financial investment believed there were strong opportunities for Wales to grow business outside of the EU, and that it was gaining a great deal of interest from Middle Eastern investors, but argued that Wales was too inwardly focused to benefit from some of this new interest.

5.9 Food and drink

The food and drink sector in Wales is diverse in terms of products, and is also one of the sectors that tends to use larger amounts of EU labour. The main points coming from the consultations with firms were as follows:

- There were real concerns over labour availability, and with one respondent reporting that they had already noticed some shift in employees back to the EU. The firm used large amounts of unskilled labour.
- Some firms faced relatively high levels of tariffs on beef and lamb, and related products. Firms involved in the beef and lamb processing sector would, under a hard Brexit, likely face more competition from the US and South America where production costs were far lower.
- With respect to lamb there was seen to be a threat to domestic production and processing were New Zealand to achieve a better access deal to the UK than it had with the EU as a whole.
- One respondent was actively seeking to grow markets in France, Germany and Poland for processed meat items with longer shelf lives. Higher tariffs on food products would threaten this market development.
- While there were concerns on tariffs on sector imports and exports for some firms in the sector there would also be issues around more complex import/export documentation, veterinary, export health, plant health certifications etc. Certification issues were a major problem with goods that are refrigerated and where delays in transportation can be costly.

- Another theme from the consultation process was what the process of EU transition would mean for the future of Welsh farming, and the nature of the post-Brexit financial settlement. Here a change in prospects for Welsh farming would work to affect prospects in the downstream processing and wholesale sectors in Wales.

5.10 Information and Communication technology

There are several companies within this group which were difficult to classify to sectors because they had extensive operations in more than one sector. Also for some of the firms in ICT there would be a fine dividing line with the Business Services sector. The themes from the consultations with firms in this sector included:

- One firm had a finance team that was looking specifically at the potential impact of tariffs on exports, but at the moment this was guesswork and not very far advanced, but the team were expected to report in around two months. Exchange rate variation was an issue in some parts of the business where there were fixed cost contracts. The firm was less concerned about product standards issues post Brexit. This was because standards for their products tended to be set at international level and then gold plated in the UK. The firm was also less concerned about having to identify the origin of goods, as this was something that they had to do anyway with their products now.
- The firm did not cite any labour market issues as a problem, and because of the specialist nature of their products did not expect erosion of their UK prospects as a result of any competition from ROW imports post Brexit.
- Another firm showed that the nature of its Welsh activity meant that few EU or ROW imports were used. The firm noted that it was taking a whole company approach to Brexit, and that uncertainty was potentially damaging for [the firm] and its customers. The firm also revealed that effects were already being felt in terms of customers delaying new business and including complex contractual suggestions to mitigate risks of Brexit, for example, with complex contractual scenarios being included to counter for Brexit risk. The firm was also concerned that Brexit could affect the amount of work coming from its overseas parent because the UK was seen as less stable market than other countries.
- That it was critical for the UK to commit to and maintain standards relating to General Data Protection Regulation, and that firms in the sector would not welcome different or diverse regulations for EU and UK and certainly not different regulations for each part of the UK. The firm argued that it would be directly affected by changes to EU and UK regulations, divergence of regulations and indirectly via effect on clients and overall business confidence.

- One respondent indicated that, given the gravity of the Brexit issue a more joined up UK approach should be taken, so that businesses should not have to deal with each devolved administration separately.

5.11 Medical/health products and services

Parts of this sector are heavily regulated and with elements of the regulatory apparatus grounded in the EU. Separate from the direct consultations there is some evidence that uncertainty caused by the EU withdrawal may be encouraging companies to consider performing R&D and new product development outside the UK. This same sector is also a significant recipient of EU research funds and has extensive linkages to Welsh higher education. Key concerns in this sector raised in the consultation included potential problems in the registering of clinical trials (i.e. duplication in processes post Brexit) and processes for licensing products for EU use (i.e. through the European Medical Agency). Moreover, the whole industry was noted as being highly regulated such that if separate quality control were needed and extended quarantine periods enforced, UK costs would increase.

The following additional themes and issues arose in the consultations:

- A firm argued a hard Brexit would have the result of a loss of productivity and competitiveness of its Welsh plant making EU production more cost competitive, and with the firm already making similar products in other EU countries. While the firm had a focus on the UK domestic market, it revealed that 100% of its key ingredient inputs went through the EU. While pharmaceuticals would not attract duties under WTO rules, this was not the case for components and packaging. These factors under a harder Brexit were seen to add significant costs to Welsh production. The firm was already planning to move functions to its parent nation, and, in the absence of detailed information on Brexit implications, recently decided to relocate office activities to elsewhere in the EU rather than renew a UK property lease.
- This same firm largely employed local people in its Welsh manufacturing, but there were concerns that hard Brexit could make it more difficult to attract highly skilled graduates and post-graduates. The company had always sought to keep these highly skilled opportunities in the UK but suggested that these opportunities previously based in UK sites would be relocated to, or recruited in, other EU countries.

5.12 Other advanced manufacturing and engineering

Other advanced manufacturing is a broad sector, and it was possible to undertake a larger number of consultations here. Due to the diversity of responses here we report the themes by the individual firms. There were six respondents here.

The first firm had a foreign parent company and, in summary, had the following points in regard to risk factors from EU transition:

- Labour market issues were not mentioned as a concern, and would mainly affect agency staff on short term contracts; there were very few full-time staff who were foreign nationals.
- Key risks revolved around market access. The firm was a contract manufacturer with two significant EU clients and with new contract negotiations underway. The parent was adopting a wait and see approach, but in this case any additional tariffs and/or additional costs of importing or shipping from either parent company or agents were seen as making the operation vulnerable. The firm already faced certificate of origin problems because critical components (sub-assemblies) were imported from Asia. Then of total purchases 80% were from the ROW and with 80% of the final product destined for the EU. The firm was expecting import tariffs on incoming parts of 5% and then duty at final destination of 5%, and was expecting this would add to ex-works prices.
- The firm's main product was in competition with Chinese imports. In this case while a hard Brexit might lead to some loss of EU trade the firm did acknowledge opportunities in terms of access to cheaper goods on world markets and less business regulation.
- There were additional concerns on safety and environmental approvals for the product which may need to be repeated after Brexit.

The second responding firm was far smaller and with markets in automotive as well as other sectors. Most of the firm sales were to the UK, with 25% of sales to Europe. The main input used by the firm was steel; while this was purchased from suppliers in the UK, some of this steel was imported and could attract duties after EU transition, and with costs passed down the supply chain. This firm appeared to see few risks for them connected to the process of EU transition.

The third company was a foreign owned complex machinery producer. Although it had sites across the EU, the vast majority of its R&D was undertaken in Wales. The EU only represented around 30% of its sales, with the remainder being in the US and Asia. Over 99% of its goods were exported. With respect to issues in the EU transition process the firm raised the following:

- That uncertainty was the biggest issue. While they were able to hedge foreign currency risks, other uncertainties linked to Brexit were a core concern.
- The firm believed WTO rules were not particularly applicable to their largest US market. Their product was seen as a 'key driving technology' such that there were few tariffs on finished equipment, but there would be high levels of tariffs (c.20%) on spare parts needed for equipment.
- That ease of travel was critical for firm personnel such that they could keep to tight service contracts on machinery, and with the firm gaining large penalties where there were any delays getting people out to sites. The firm also noted that it had seen an increasing trend in employees seeking Irish passports since the Brexit vote.

The fourth firm consulted estimated that around half of their sales were exports, and evenly divided between EU and the ROW. This firm provided no further details of the challenges linked to EU transition for them.

The fifth firm served largely domestic markets (residential and commercial) and is a FTSE 250 registered firm with an executive management team based in Wales. Much of the output goes directly to UK construction sites. The majority of staff at the Welsh plant live locally and the firm did not expect changes in regulations over the movement of labour to have a direct impact on the company. The firm respondent revealed that the consistency in regulations was a key factor, and that the firm was anxious not to have to navigate different sets of regulations within the UK. The firm had not studied tariff structures on final products in detail but these would impact on competitiveness – and with strong competitors in the market that were EU based. However, tariffs were expected to be more of an issue with material costs (i.e. purchases from UK suppliers who themselves imported from countries such as Germany, China and Brazil). The indirect import dependence meant that exchange rates were a bigger concern than tariffs.

The final firm was a long established global firm, headquartered in Wales with local design facilities. EU markets were served from their Welsh plant but the firm had another base in the US serving that market. The firm had seen recent growth, and believed future prospects were tied to domestic economic growth as opposed to Brexit related tariffs, with 85% of sales in the domestic market. The firm used minimal EU labour, and with around half of spending in Wales. Key issues on EU transition included:

- The firm worked to EU standards around strength and stability of their products, but there were some concerns over non-tariff barriers related to regulation. The firm did note that a possible loss of the Euro clearing house in the UK would have a very significant effect on them because of their particular client base.
- The firm was less concerned about tariffs on their products because their products led on quality as opposed to price.
- With the foreign sales that the firm did have the firm expected that if there was increased customs bureaucracy, they would employ an extra 1-3 people to handle this. However, the firm was very concerned about future requirements to retrospectively test / certify goods in the EU which would carry a heavy cost for them.

5.13 Paper, wood and wood products

The consultations in this sector revealed the following themes/issues:

- That the weakness of sterling following the Brexit vote had improved the overall competitiveness of UK timber processing, but this was expected to be a temporary effect. Key markets for Welsh large and medium sized firms in timber processing tended towards the UK, particularly in the construction and housing sector, where business uncertainty was expected to hit at short term investment levels. There were concerns on how the Brexit process was affecting confidence in housebuilding, and some timber processors had already seen a cut in orders as some construction and development projects were put on hold. Overall, however, Brexit was not to seen to be the dominant factor affecting timber processing or timber values.
- One large firm in the sector was already expecting a significant new regional investment post-Brexit, and believed that they still had long term and sustainable business in the UK.
- That post-Brexit agriculture and forestry grants would no longer be paid by the EU, meaning that were UK funding to take over there could be more national influence on the forestry sector. EU subsidies following CAP would no longer apply. One issue

was how these funding and subsidy changes affected the comparative economics of sheep farming, and with poorer prospects in some parts of agriculture meaning that more woodland might be created affecting the timber industry supply side.

- That there were post-Brexit opportunities to change procurement and state aid rules to encourage locally manufactured materials, and the possibility of post EU transition imposition of rules to use more home grown timber and low carbon solutions which would benefit the industry.
- Some firms producing paper goods in this sector do not use domestic inputs but actually import paper from other countries both inside and outside of the EU. In general finished products in the sector tend not to be transported over long distances because of cost, but also tend to be associated with relatively low tariffs. One firm consulted showed that while they were examining the effects of Brexit, one of their major customers had set up groups of their suppliers to consult on Brexit effects. At the same time the nature of the firm's products and the bulkiness of them meant that there was more reliance on domestic demand, and with more concerns on how the low value Sterling affected the price paid for imports.

5.14 Process and chemicals

The responding firms were large multinational chemical/fuel producers which had been established in Wales for many years. In the consultations the importance of free access to competitive energy supply was a theme. The consultation process with this sector also revealed concerns on whether the regulatory framework around the environment will change post-Brexit, and on the future progress of the EU ETS (Emissions Trading Scheme) and how it will be integrated into UK law, and then whether process and chemicals sector firms might have to pay more for UK compliance.

Another Brexit 'risk' factor related to how industry regulations would be imposed after Brexit. In particular in respect of regulation was how far the UK would adopt more of a risk based as opposed to a precautionary approach to regulation. This was seen as a potential opportunity from Brexit with the UK having the latitude to move away from the precautionary approach on chemicals used in processes which could add costs to some Welsh operations.

In similarity to the medical products sector there were also concerns around how product registration would be affected by Brexit, and how far existing product registrations might become invalid, particularly for smaller firms in the sector who had higher compliance costs. Specific mention was made of the REACH (Registration, Evaluation and Authorisation of Chemicals) framework came into being in the EU during 2007, but also governs chemical material sourced from areas outside of the EU. The objective of REACH is to better protect human health and the environment as well as enhance the competitiveness of the chemical industry by fostering innovation.

One firm consulted revealed that it was currently adopting a close watching brief on evolving issues around tax, customs, compliance, transportation and environmental regulation. It was also liaising directly with organisations such as the UK Treasury, BEIS, and the Department for Exiting the EU. This firm cited opportunities post Brexit in terms of access to cheaper raw materials from ROW, and the potential for less business regulation. There was a particular concern that Welsh Government ensured post Brexit that levels of compliance were not imposed in the UK over and above that applying to competitors.

5.15 Steel

Steel production in Wales is dominated by one firm. Much of the steel produced in Wales goes into automotive, construction products, and then coated steels for electronics products. For these reasons the steel sector exports itself outside of the UK, but Welsh steel is an important part of the supply chain to major exporters in the automotive and electronics products sectors.

Although we have not used evidence provided by Tata Steel in producing this report, we are aware that longer term future of steel making at Tata Port Talbot partly depends on negotiations with Thyssen Krupp on a joint venture to consolidate operations in Europe. At the time of writing in July 2017 the outcome of this deal is very uncertain, but if successful could lead to further investment at the Port Talbot plant. This would be needed as further blast furnace investment will be needed at Port Talbot in 2019-20. However, the Welsh steel industry as a whole faces major pressures in terms of relatively high energy costs, import pressure from China, commodity price inflation, and the prospect of tariffs on steel following EU transition. However, sterling depreciation has worked to make foreign steel more expensive for UK producers, while at the same time working to make raw materials (typically priced in US $) more expensive. Overall, the steel sector across the EU has overcapacity which makes steel making one of the more vulnerable sectors during the EU transition process.

The consultation process in this sector revealed the following:

- Several steel makers in Wales make use of electric arc furnaces, and scrap metal as a feedstock, and with key markets being the construction sector. For these reasons it is relative energy prices that are a key variable in international competitiveness, and this seemed to be more important than direct concerns over Brexit.
- Potential custom delays could add to steel maker costs and could be an important issue. Other non-tariff barriers were expected to be less of a problem i.e. demonstrating proof of origin, or product standards.
- On tariffs – one company believed that the WTO model would mean zero tariff on the products they make. The main concern would be products coming into the UK from non-EU, and anti-dumping policies, and with steel production in Wales at risk from secondary dumping.
- A responding firm revealed that for them a real problem during EU transition was uncertainty in future investment until the exact nature of the transition process was known. For the Welsh business, the firm believed there were few risks in terms of short term loss of EU trade pre or post Brexit, and with the domestic UK market of more importance. This firm saw potential for more 'buy British' behavior in steel procurement as an opportunity – with UK infrastructure projects in particular – although some refinement would be needed on a definition of locally made steel. This firm had tried to get the UK Government to publish figures on the amount of UK steel in construction projects but have so far been unsuccessful.

5.16 TV Production and Creative

One element of the sector in Wales is studio locations and facilities. For TV production activities the consultations revealed that EU trade was of less importance than US and ROW markets. One consultee showed that they produced very little programming for the EU market. The consultations showed that the current low value of the pound was making the region a relatively cheap location to film although with well-established competition from Central and Eastern European locations. A further issue for selected firms in this sector was the existence of UK tax credits, for film, television and video games, and with some Welsh firms known to be interested in whether in a post Brexit world that there might be opportunities to aim UK tax reliefs at UK projects which would improve the competitiveness of the sector vis-a-vis countries that enjoy relatively high incentives. There is also concern in the sector on whether restrictions to EU travel post Brexit might work to increase the costs of organising overseas film production.

Other points made by firms consulted in this sector included:

- Major elements of costs were staff, energy and business rates which were not imported and only limited use was made of EU staffs.
- The major concern for firms in film and TV production would be any state aid changes or changes to tax reliefs during the EU transition process. For some any changes would be a game changer with current reliefs set to expire in 2019/20. Concerns were also expressed over the loss of EU funding for the industry.
- Brexit was reportedly low on the risk register, although changes could make selected productions more difficult (i.e. where crews and elements of production took place in the EU). It was actually relations with the US market which were most important and any bilateral trade deals here could have important effects on the industry.
- Some parts of TV production saw limited scope for EU expansion because TV and film was one of the most heavily regulated sectors, and with state owned broadcasting a real barrier in places such as France which was viewed as having quotas regarding the level of production costs that have to be initiated in France.
- Free movement of labour restrictions were not viewed as representing a major issue for firms in this sector with staff from overseas tending to be in very specialist posts and it was expected that any new system of visa control would allow for this. There was concern on whether changes indirectly linked to EU transition would affect access to ROW freelancers, and with some TV production firms using large numbers of such on sport programming and production.

5.17 Business Services and Insurance

No direct one to one consultations were undertaken with large and medium sized firms in these sectors. There are just three business services firms among the Anchors and RICs on which the main consultation process was largely based, although there were several smaller firms in the roundtable events from business services. There is a strong expectation with firms in these sectors that their prospects are more driven by development of UK domestic demand and with very less dependence on imports. It is also accepted that Business Services in this report is very broadly defined. Two Anchors are involved in Insurance. Both have existing subsidiaries in the EU, but with operations in Wales largely serving domestic demands.

5.18 Conclusions

The focus of this section was respondent views of factors increasing risks to their Welsh operations related to the EU transition process. Evident here is complexity. Indeed in some cases firms had some lines of business that could be strongly affected and others less so.

However, the consultations showed a clear line of demarcation with manufacturing firms expecting to be more directly affected by a hard Brexit, and with a mixture of tariff and non-tariff barriers noted as differentially important.

Firms in sectors such as financial services and construction & civil engineering, expected to be indirectly effected as a result of domestic demand changes and falling business and consumer confidence.

The consultation process also identifies strong variation in the level of embeddedness of large and medium sized companies in Wales with this strongly related to the opportunity to move production elsewhere in the UK, or disinvest from the UK/Wales at the end of a product cycle.

6 Wales and UK Linkage Analysis

6.1 Introduction

This section assesses the importance of different sectors of the Welsh economy in terms of their backward linkages or 'multiplier' effects. When levels of economic activity (or employment) change in a firm or sector it can have important implications for other parts of the regional economy through supply chain and wage effects; if a sector contracts or grows, not only will other firms across that and other sectors see their own demand change, but so will any regional firms that supply goods or services to affected workers.

Here the regional linkages of sectors which include large and medium sized Welsh companies are analysed. Due to resource, time and data constraints the analysis here does not relate to any individual company but to the relevant sector as a whole. Rather than reporting multipliers or other quantitative metrics that can be confusing or open to misinterpretation, a 'traffic light' approach is used, ranking sectors in terms of high (red), medium (amber) or low (green) regional linkages. The use of this system is predicated on the assumption that there is some interest in identifying those sectors where losses of sectoral activity following Brexit would have the starkest consequences.

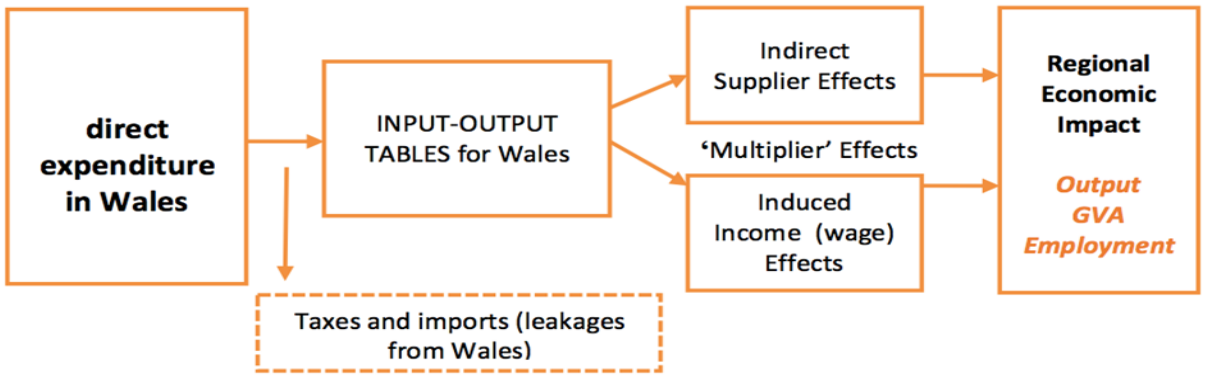
In order to bolster the analysis and address some region-level data weaknesses (see below), the analysis is also undertaken at a UK level, presenting those defined sectors which are most deeply linked to the UK economy. The material on Welsh linkages is integrated into the analysis of overall risk profiles facing defined sectors in section 7 following.

6.2 Methodology and Data

The estimates of regional (Wales) and national (UK) indirect economic impact rely upon use of Input-Output (IO) Modelling to assess the offsite economic activity – employment and gross value added – dependent on our chosen sectors. Input-Output Modelling has a long history in similar applications, despite a number of limiting assumptions and caveats[5]. IO analysis enables an estimate of the economy-wide impact of a specific activity by tracing the 'ripple effects' along supply chains as firms purchase goods and services in the wider economy and as employees – at affected firm(s) and in the supply chain – spend their consequent wages in part in the reference economy.

Wales is unusual amongst UK regions (Scotland excepted) in that it has a bespoke and detailed 'picture' of the regional economy in Input-Output form that has been published since 1997 in various editions by the Welsh Economy Research Unit at Cardiff Business School. It is the Input Output Tables for Wales, suitably restructured from their published form, which are used for regional impact analysis. The Input Output tables report on economic output/turnover; employment, in terms of full-time equivalents and gross value added. It is the latter two that are of particular policy interest.

Figure 6.1 The Input-Output Assessment Process



[5] See Miller and Blair (2009) *Input-Output Analysis: Foundations and Extensions* http://assets.cambridge.org/97805215/17133/frontmatter/9780521517133_frontmatter.pdf

The IO Tables have been used for a variety of projects and analyses in recent years including;

- Assessing the economic (and environmental) impact of tourism for Welsh Government, and of specific tourism elements such as the Wales Coast Path and Swansea FC[6]
- Estimating the economic impact of Cardiff University[7]
- Assessing the impact of Tata Steel in Wales[8].
- Estimating regional energy generation multipliers[9].
- Identifying the local economic development opportunities from NHS spending[10].
- Estimating the value of a Premier League football club to the regional economy – the case of Swansea City Football Club[11].

The analysis presented here is therefore comparable with these studies, and with others undertaken in Wales since Devolution.

The latest version of the Input Output Tables for Wales relate to 2007 (although there has been extensive *ad hoc* updating of a number of sectors to represent more recent analysis). In order to present a timelier (albeit geographically coarser) analysis the Welsh results are complemented with an analysis of UK-level multiplier linkages based upon the 2013 UK Input-Output Tables[12].

---

[6] http://www.cardiff.ac.uk/research/impact-and-innovation/research-impact/understanding-the-economic-and-environmental-impacts-of-tourism-in-wales

[7] https://www.cardiff.ac.uk/__data/assets/pdf_file/0008/108179/Economic-Impact-of-Cardiff-University-February-2015.pdf

[8] https://publications.cardiffuniversitypress.org/index.php/WER/article/download/14/14

[9] Bryan, J., Evans, N., Jones, C. and Munday, M. Regional electricity generation and employment in UK regions. *Regional Studies*. Published Online November 2015. DOI: 10.1080/00343404.2015.1101516

[10] Morgan, K, Munday M. and Roberts A. Local economic development opportunities from NHS spending: Evidence from Wales. *Urban Studies*. Published Online July 2016. DOI: 10.1177/0042098016658248

[11] Roberts A., Roche N., Jones C. and Munday M., (2016). What is the value of a Premier League football club to a regional economy? *European Sport Management Quarterly,* v.16, 575-591. DOI: 10.1080/16184742.2016.1188840

[12] Due to methodological differences, the UK analysis relates only to supply chain linkages, excluding wage effects.

The key metrics that inform the assessment of economic linkage are the multipliers that emerge from IO analysis – indicating how much gross value added (GVA) and employment is likely to be impacted by changes in the reference sector. Multipliers (of both types) are usually between 1 and 2; one unit of initial change in GVA/employment leads to a positive but smaller indirect impact across the rest of the economy.

Some sectors will have multipliers greater than 2 and for some sectors, and for employment in particular, much greater. However, these multipliers presented in isolation give an incomplete picture of aggregate economic impact. For example, analysis of the Welsh energy supply sector[13] resulted in extremely high employment multipliers, but these are closely related to the very high level of capital employed per worker and the (also related) small number of employees overall – an appreciation of which is necessary to understand the importance and investment context of the sector.

In part to abstract from such complexity, and to avoid inappropriate precision, the embeddedness of the defined sectors are presented in a traffic light system. A red cell indicates a sector which is in the top third of all Welsh (or UK) sectors in terms of its indirect employment (or GVA) impacts, and thus where losses would be especially problematic[14]. Green sectors are those that are in the bottom third or 'least linked' in employment or GVA terms.

It is worth noting that sectors may be deeply embedded (and hence 'red') for a number of reasons including high wages (and hence high wage effects), strong regional/national supply chains, or their position in value chains, with different factors potentially contributing to a high or low embeddedness within the same sectors.

[13] See footnote 8 above.
[14] There are 88 sectors in the Welsh IO Table, and 124 sectors in the UK Table.

6.3 Results

Table 6.1 presents the results of the linkage analysis. As can be seen there are a number of sectors that show high Wales-level backward linkage in terms of GVA and employment and hence would be of especial concern should Brexit negatively affect competitiveness, trade or investment decisions.

Notable amongst these sectors are Aerospace (and related) and Automotive (and related)[15]. These are red sectors at both Wales and UK level. Both employ significant numbers in Wales; well into the tens of thousands of employees in both cases. Meanwhile, the steel industry displays a similarly high level of linkages, although here the numbers directly employed in Wales are somewhat lower, and the sector of course is concentrated around a very small number of firms.

The Food and drink (processing) sector also shows a high level of GVA and employment linkage at Wales and UK level, as does Energy and utilities. These are clearly sectors significant themselves in terms of both GVA and employment.

Within Wales, Financial Services also presents 'top third' results in terms of GVA and employment linkages, although this is not replicated in its UK position. A number of other sectors – Construction, Electrical/Electronics and Insurance – are notable for their Wales-level GVA multipliers.

[15] Note UK and Wales' IO sector classifications are somewhat different in title and SIC coverage but this has no significant impact on the results

Table 6.1 Sector Linkages: Wales and UK

	Welsh Economy Linkage		UK Economy Linkage	
	GVA	**Employment**	**GVA**	**Employment**
Aerospace systems and services				
Automotive, transportation and related				
Business services				
Construction and civil engineering				
Electrical engineering, electronic components, semiconductors				
Energy & utilities				
Financial services				
Food and drink				
Information and communications technology				
Insurance				
Medical/health products services				
Other advanced manufacturing and engineering				
Paper, wood, wood products				
Process and chemicals				
Steel				
Television production and creative				
Textiles, clothing and marketing				

Notes:
Red=High impact,
Yellow=Middle Impact
Green=Low Impact

Sources: Input Output Tables for Wales, 2007; UK Analytical Input Output Tables 2013

6.4 Conclusion

In terms, of Welsh and UK backward linkages a number of sectors stand out as key: Aerospace, Automotive, Energy, Food and Drink, and Steel. These sectors have a number of characteristics that drive their importance in Wales particularly; for example a very high level of capital employed per worker, high wages and (in most cases) strong supply chains within the region.

A number of these sectors have a high level of international orientation, either in terms of ownership, customers, or their embeddedness in global value chains. This will a priori increase their vulnerability to Brexit-related economic shocks.

7 Sector Risk Profiles

7.1 Introduction

This section seeks to capture the key points and issues from the analysis in the earlier sections of the report. As noted in Section 2 the identified sectors will be evaluated against eight EU transition risk criteria. Ratings are derived for 16 as opposed to the 17 defined sectors. This is because we were unable to derive consultation evidence to support any conclusions on the textiles sector, and this sector is excluded from the discussion in this chapter). Whilst the different risk factors may be more significant/important than others for each sector, no attempt has been made in this section to weight the risk factors. In addition, in some cases the risks are uneven within the sector; some firms in the sector will be more prone to the risk than others. Finally, it should be noted that although a range of quantitative and qualitative evidence has been collected and analysed, the evaluation of the risks in the defined sectors, is subjective, based on the views of the research team. A colour coding system is used to aid the visual presentation. Table 7.1 provides a summary of the risk ratings attached to each criteria by sector.

7.2 Potential direct and indirect tariff effects

This risk component is based on the export intensity of large and medium-sized firms within the sector, combined with the expected rate of WTO export tariffs which would be applied to sector products produced in Wales. However, also considered are cases where large and medium-sized firms supply to RUK firms that subsequently export to the EU (i.e. expected levels of WTO tariffs for firms which large and medium-sized firms sell to in RUK).

Table 7.1 Summary of risk rating by Anchor/RICs sector

	Effects of tariffs on sector export trade directly and indirectly	Effects of tariffs on inputs	Effects of non-tariff barriers on trade and activity	Labour market risks	Effects in regional economy of changes in activity of firms	Effects linked to loss of access to EU knowledge and innovation networks and frameworks	Current age and structure of assets in Wales, susceptibility to corporate investment cycles	Positioning in corporate networks, embeddedness and likely options to displace Welsh activity
Aerospace systems and services	Medium/High	Medium	High	Medium	High	High	Medium/High	Medium
Automotive, transportation and related	High	High	Medium	Low	High	Medium	High	Medium-High
Business services	Low	Low	Low	Low	Low-Medium	Low	Low	Low-Medium
Construction and civil engineering	Low	Low	Low	Low-Medium	Medium/High	Low	Low	Low
Elec. Eng.components, semiconductors	High	High	Medium	Low	Medium/High	Medium	Medium-High	Medium-High
Energy & utilities	Low	Low	Low	Low	High	Low	Low	Low
Financial services	Low	Low	Low	Low	High	Low	Low	Low-Medium
Food and drink	Medium	Medium	Low	Medium	High	Low	Low	Low
Information and communications technology	Medium	Low	Low-Medium	Medium	Low-Medium	High	Low-Medium	Low-Medium
Insurance	Low	Low	Low	Low	Medium/High	Low	Low	Low-Medium
Medical/health products and services	Low-Medium	Medium/High	Medium	Low	Medium	High	Low-Medium	Medium
Other adv. manufacturing and engineering	Medium-High	Medium	Medium	Low	Low-Medium	Low-Medium	High	Medium-High
Paper, wood, wood products	Low	Low	Low	Low	Medium	Low	Medium	Low-Medium
Process and chemicals	High	Low	Medium	Low	Medium/High	Low	Medium-High	Low-Medium
Steel	High	Low	Medium	Low	High	Low	Medium-High	Medium
TV production and creative	Low	Low	Low	Low-Medium	Medium	Low	Low	Low

On this risk four sectors were rated as High: Automotive transportation & related; Electrical engineering etc; Process and chemicals; and Steel. In each case the rating is partly linked to sectors with whom the firms sell to within the UK being linked to relatively higher tariffs. In these cases, the effects on the Welsh firms is more indirect as higher tariffs affects the larger UK businesses with potential rebound effects back into the regional economy. However, some parts of the Electrical engineering and electronic components sector are producing final goods for export to the EU which would face relatively high tariff levels. In the consultations firms in these sectors highlighted major tariff-associated risks to margins.

Other Advanced manufacturing and Aerospace systems and services were rated as medium-high on tariffs.

For the majority of sectors the issue of tariffs was rated as low or low-medium, meaning it was either not applicable because of a higher dependence on domestic markets as opposed to exports, or that products were would likely face low tariffs under a WTO outcome. It should be noted that for Food and drink especially, its competitiveness could suffer from rest-of-world imports post-Brexit. This could affect both exports to the EU and its performance in the domestic UK market. The impact of such developments (or indeed free trade agreements with Australasian or South American nations that are heavy food exporters) is very difficult to judge at this stage.

7.3 Non-tariff barriers

There is a general uncertainty on the types and nature of potential non-tariff barriers that may apply to different firms/products. The scores for this risk factor were based on sectoral information gathered through the literature review process and on the views of respondents to the consultations. Only Aerospace systems and services have been rated as high risk on this factor, as regulations and certifications were noted within the consultations as being of particular concern given the nature and complexities of their value chains.

Whilst only one sector has been rated as high, this risk factor has a medium rating for most other sectors that have traded goods, with the exception of Food and drink and Paper, wood and wood products. In the case of Food and drink, whilst some firms consulted noted potential problems of certification etc., the low score is partly based on the generally low overseas export dependence of large and medium-sized firms in the sector, a factor which also contributes to the low score for Paper, wood and wood products.

The medium rating that has been allocated to the trading sectors in Table 7.1 may be considered as a conservative score, with a key issue relating to the uncertainty and complexity surrounding potential future non-tariffs, partly a consequence of a general lack of specific data to guide the ratings at this point in time.

7.4 Effects of tariffs on inputs

The consultations together with the analysis of WTO tariffs reveals that for some sectors there is a degree of correspondence between tariff on exports, and those on imported goods. With respect to tariffs on key inputs both Automotive, transportation etc. and Electrical engineering etc. were rated as high. Indeed, some of the firms in these sectors examined in the consultations were already paying tariffs on imported components coming into the UK. Medical/health products and services was rated medium-high due to higher duties on selected chemicals being used within the drugs manufacturing process.

Low scores on tariffs on inputs either reflected that large and medium-sized firms in the sectors used limited imports of goods, or that these firms used imports that attracted lower levels of duties.

7.5 Labour market risks

The labour market risks were not considered to be high for any of the defined sectors. Section 4 showed the relatively low use of EU workers by sector in Wales, although noting the importance of access to EU workers for some firms.

In Table 7.1, Aerospace systems and services and ICT are rated as medium due to the importance of access to particular skills, and the ability to transfer staff within corporate operations. In contrast, in the Food and drink sector, the labour market concerns of some firms relate to the availability of unskilled EU workers. The remaining sectors were rated as low or medium-low risk as labour market concerns were not noted as being particularly important by large and medium-sized firms in these sectors.

7.6 Effects in the regional economy of changes in sector activity

The ratings for this risk factor draw heavily on the analysis provided in Section 6 of this report, and the impact scores in Table 6.1. These scores were based on a quantitative analysis of the linkages of the defined sectors within Wales. Hence this is a general sectoral perspective, rather than just for the large and medium-sized firms within the sector.

This risk factor is generally high, medium/high or medium in most of the defined sectors, with only three scoring low/medium.

Some of those sectors scoring high on this factor will be due their relatively high local sourcing, such as in the Food and drink sector, whereas in others the high score may largely be a consequence of the use of relatively high wages, which will create higher local demands for goods and services. Other sectors will have a combination of relatively high local sourcing and wage effects (for example, the Steel and Automotive, transportation sectors).

The generally high scores for this factor across the sectors are indicative of the importance of these sectors, and the large and medium-sized firms within each sector, to the economy, and the potential effects of any changes in their activity within the Welsh economy.

7.7 Effects linked to the loss of access to EU knowledge and innovation networks and frameworks

The ratings for this risk factor have been derived using information from the literature relating to knowledge and innovation networks and the sectors where these are particularly important in an EU context. The consultations have provided additional information for some of the large and medium-sized firms within these sectors.

Three sectors score high on this risk factor; Aerospace systems and services, ICT, and Medical/health products and services. The nature of many large and medium-sized firms in these sectors are characterised by their corporate linkages within the EU, and where access to EU institutions, research networks and funding opportunities is important. In the Aerospace systems and services case, the consultations also noted issues relating to the possible loss of influence in these knowledge/innovation networks, a concern shared by a consultation respondent in the Electrical engineering etc. sector, where the firm currently engages in research and industry collaborations. These types of concerns were not particularly generalizable for this sector, but in this sector and in Automotive etc, this risk was scored as medium. The mix of firm characteristics in the broad Other advanced manufacturing sector, has contributed to a score of low-medium, and the remaining sectors have a low score on this risk factor.

7.8 Susceptibility to corporate investment cycles; age and structure of assets/options to displace activity

Six sectors were rated high or medium-high on this risk factor due to the product or asset life stage of Welsh production: Aerospace systems and services, Automotive, Electrical engineering etc; Other advanced manufacturing and engineering; Steel, and Process and chemicals. The assessment in this report reveals large and medium-sized firms in these sectors which are, in the short term (1-3 years), particularly susceptible to changes linked to shorter product cycles, new models coming on stream, new investments being considered, and with parent firms sensitive to any factors that may cause cost inflation.

There is also (see Table 7.1) strong correspondence here between this criteria and that related to sector embeddedness in Wales, and opportunities to displace activity to other parts of the EU or further afield. Issues around age of assets or corporate investment cycle susceptibility need to be understood also in terms of the level of sunk costs in the regional economy (both in terms of physical and skilled human assets), and the ease with which activity can be transferred either within a corporate group, or to other subcontractors. For example, during the consultations it became clear that some parts of the Electrical engineering and electronic components sector were effectively contract manufacturing for other corporate groups in the EU, and with this activity particularly prone to EU transition pressures. These same companies undertook very limited research and development in the Welsh economy. Care is required here with generalization, with selected firms in the areas of semiconductors and related services/engineering featuring higher levels of embeddedness, although still prone to cycles of new investment and the introduction of new technologies.

Process and chemicals and Steel were rated as medium-high on age of assets, and with many of the products produced by these sectors in Wales mature, and with much of the Welsh sector operating in markets where across the EU there is marked over capacity (steel, oil refining). However, with Process and chemicals, options to displace are more difficult because of the high level of sunk costs in the Welsh case, and this is rated low-medium. For much of the steel production sector in Wales, current restructuring across the large European groups mean that displacement risk is higher and rated as medium.

7.9 Risk Analysis

The discussion above has provided some commentary on each risk factor, noting which sectors were high/low risk etc., and explaining the rationale for these scores. This section seeks to provide more of an overview, firstly of the risk factors, and secondly of each sector.

A risk factor perspective can be achieved by viewing the columns of Table 7.1. Such a perspective enables some identification of risk factors that will have the broadest impacts across the defined sectors. Care is needed in judging the importance of the risk factors purely by the number of cells which score high and medium. The risk factors have been given equal weighting in the analysis, however in reality some risks will be more significant in terms of potential impacts than others, with risk weightings also varying by firm. In addition, there will be more scope for a potential policy response to some risk factors than others.

With these limitations noted, the scores in Table 7.1 show the potential significant economy-wide risk from changes in activity amongst the large and medium-sized firms in the sectors. For most of the sectors, the score is high or medium-high, and there are expected to be significant wider effects in the rest of the economy (in terms of jobs and GVA) from any changes in the levels of activity of these firms. As already noted, many of the large and medium sized firms in these sectors are characterized by either relatively high levels of embeddedness within the economy, and/or by relatively high wages.

A comparison of the risk levels for each factor suggests that tariffs are a higher risk factor than non-tariff barriers, with a larger number of sectors scoring high for that risk. However whilst the tariff risk is significant for many sectors, there is a more limited scope for policy intervention from the Welsh Government to mitigate such risks for Welsh firms, other than to potentially negotiate with UK government on their Brexit approach. The non-tariff risk is fairly universal across the production sectors. The discussion on this factor in section 1.3 above noted the present lack of information and uncertainty on non-tariff risk. As more information becomes available, this is however a potential area where Welsh Government could assist business to understand the issues and how to incorporate them into any planning decisions.

Overall, labour market risks are considered to be the least significant factor in Table 7.1. This risk factor was considered to be a medium risk in 3 out of the 16 sectors, and medium-low or low risk in the other sectors. Again, with equal weightings and a sectoral approach, these scores will mask some potential high risks within individual firms.

For a sectoral risk overview, the risk ratings in the rows of Table 7.1 can be assessed. Figure 7.1 incorporates information on the significance of the risk factors for each sector, together with the data on the importance of the sectors to the Welsh economy, by charting sector risk against that sectors employment location quotient (LQ). As noted earlier, the risk factors in Table 7.1 have been given an equal rating in the analysis. Overall sector risk is then calculated by assigning scores to each level of risk. A high risk rating is given a risk score of 5, medium-high has a score of 4, medium is scored as 3, medium-low as 2, and a low risk rating is scored as 1. The individual risk scores are then summed for each sector to arrive at an overall risk score. The employment LQ has been derived using employment data for 2015. The LQ shows the relative importance of that sector in Wales compared to Great Britain. A LQ which is greater than 1 shows that that sector is relatively over-represented in Wales compared with GB.

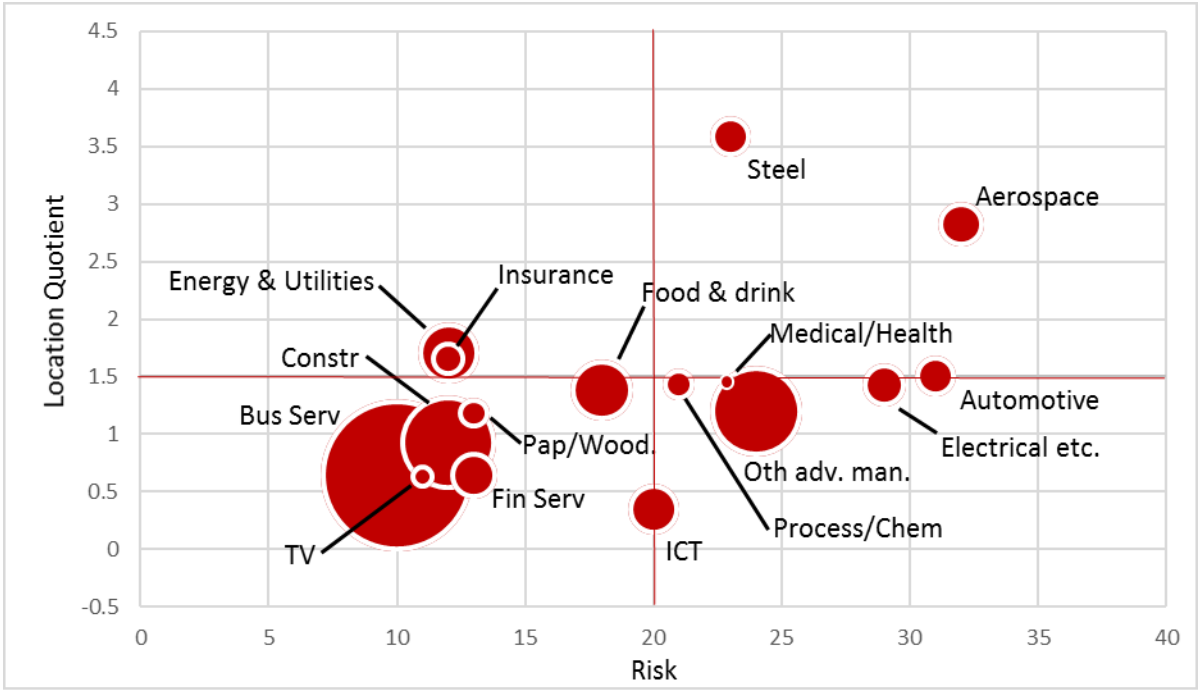
The solid lines on Figure 7.1 separate the sectors into above and below average risk, and into relatively high and lower LQs, such that sectors in the top right hand side of the figure are both above average risk and relatively significant (in employment terms) in Wales. A further dimension has been provided in Figure 7.1 to show the absolute size of each sector in Wales (using an employment measure) by varying the size of each data point.

The sectors which are high risk, with high LQs are Steel and Aerospace systems and services, whilst the Automotive and Electrical engineering sectors are also high risk with LQs around 1.5. Sectors with above average risk, and with LQs just above 1 are Other advanced manufacturing (which is the largest defined sector with above average risk), Medical and health products and services, and Process and chemicals.

ICT has an average risk score of 20, but a low LQ, suggesting this sector in under-represented in Wales. Business services is by far the largest defined sector (using an employment measure) in Figure 7.1, and this sector has been rated at low risk, and is also relatively under-represented in the economy. As expected, those sectors with below average risk are associated either with services activities, or products which are not extensively traded overseas. The Food and drink sector, contains a number of exporting firms, but within some of the large and medium-sized firms, exports are more limited with many products targeted at the domestic market.

The information within Table 7.1 and Figure 7.1 provides some useful insights regarding those sectors which have risks across a series of factors. The Welsh Government may consider keeping a particularly close 'watching brief' on firms within these sectors during EU transition, with the recommendations in the next section of the report being particularly relevant for these sectors.

Figure 7.1 Risk, Location Quotient and Sector Employment



8 Conclusions & Recommendations

8.1 In Summary

This report has sought to establish the impact of Brexit on a selection of large and medium sized firms in Wales, the sectors they inhabit and the Welsh economy in general. This approach is extremely partial, and this report does not cover important impacts on, for example, SMEs, the rural economy or the higher education and science sector. Moreover, the report does not deal with selected sectors such as Tourism which could, for example, see more serious labour market impacts resulting from Brexit. Additionally, with the shape of Brexit as yet unknown, and within the constraints of this project, this report can only indicate the likely scale and nature of impacts.

Nonetheless this research project has revealed a number of key themes and areas which will be useful in considering the impact of Brexit on Wales' larger firms; their potential responses; and in developing reactive policies.

Notably, respondents in sectors that are non-EU oriented (in terms of inputs and markets), and with place-embedded production, may see Brexit as a *relatively* minor problem. Sectors here include Construction and civil engineering, Paper and wood, Business services and TV production. Even here of course there is the prospect of impact should the UK economy overall experience slower growth as a result of Brexit.

8.2 Impact Avenues

Larger firms in Wales cite a variety of mechanisms whereby Brexit may impact their business in Wales. To broadly summarise:

- In a number of cases a hard Brexit resulting in **EU Tariff barriers**, in terms of inputs, final products or both, will reduce the competitiveness of Welsh products. In some cases (Automotive) even tariffs of 5-7% will have an extremely deleterious impact on local profitability. In other cases, Food and drink especially, tariff barriers may effectively reduce EU exports, at the same time as Welsh producers are exposed to lower cost global competition.

- Similarly, should the UK find itself outside the single market and associated regulatory frameworks there are a number of ways in which **non-Tariff barriers** may impact Welsh firms' cost, competitiveness and exports. These barriers vary widely between sectors. Firms in Medical/health products and Process and chemicals sectors, for example, would find themselves outside of longstanding EU approvals processes and other agreements that might imply border delays, and increased costs in duplicating such processes should they wish to continue to export to the EU. In other cases such barriers are more subtle; for example, for Aerospace systems and services and Other advanced manufacturing they may be related to the ability to participate in pan-European consortia and engage in defence procurement.
- There was generally a lower level of concern (although some evident) in terms of the **labour market impact** of Brexit. Where this was evident, it related to both the availability of un/low skilled workers (e.g. Food and Drink) *and* the ability for highly skilled non-UK resident technical staff to travel and work within multinational plants in the UK (Aerospace systems and services; Other advanced manufacturing).
- A small number of respondents, those with strong non-EU markets, notably in Process and chemicals, identified **potential benefits from Brexit** in terms of lower-cost inputs, lower levels of regulation and environmental standards. This issue is discussed later in this section.

8.3 Company Responses to Brexit

Potential company responses to a (hard) Brexit were very varied, linked to firm-, sector- and plant-specific issues. In summary however;

- For a number of firms the prospect of Brexit resulting in **significant disinvestment** from Wales (and the UK) – and in some cases potentially complete exit – was a real one. The companies in this bracket tended to be multinationals with a large presence in Wales; a number of these in the Aerospace systems and services, Automotive, transportation etc., and Electrical engineering etc. sectors.
- This disinvestment would result from **intra-firm competition for investment** for plants with products at the end of the life cycle or where production could be easily shifted overseas. It should of course be noted that such competition can result in plant disinvestment irrespective of Brexit.
- Where firms had higher sunk costs, or were otherwise less mobile, it was envisaged that any Brexit-related loss of competitiveness would result in lower returns from EU exports.

8.4 Impacts on the Welsh Economy

- Firms and sectors have differing levels of importance to the Welsh economy, based on their level of employment and pay, supply chain impacts and value adding activity. The research in this report suggests that this direct and indirect economic importance is particularly notable for Automotive, transportation etc. and Aerospace systems and services, which are well paying and high value-adding sectors, directly employing very high numbers and supporting high levels of employment and value-added across the rest of the Welsh economy.
- Steel, Energy and utilities, and Food and drink have similar characteristics, albeit with somewhat fewer directly employed in Steel (and lower direct wages in Food and drink).
- There are a number of sectors where economic impacts are likely to be important but more complex including, for example, the implication of Medical/health products companies ceasing to be involved in EU-driven research with potential regional knowledge spillovers and commercialization prospects.

In synthesizing the research undertaken for this report, primary, secondary and following economic modelling, there are a number of key findings, even at this early an uncertain stage of Brexit that might have implications for regional economic impact and policy response:

- The plants in Wales most vulnerable to a 'hard' Brexit are typically **branch plants of multinationals with production options elsewhere in Europe**, where intra-firm investment is subject to rounds of internal competition, and where new products or investment decisions are imminent.
- A number of these firms are in the **Aerospace, Automotive and transportation, and Electrical engineering etc**. sectors and are amongst Wales' largest private sector employers, and have very significant indirect economic contributions.
- Firms in sectors such as **Steel, and Process and chemicals** may face similar pressures but in some cases have high levels of sunk costs in Wales which make disinvestment a medium-term prospect.

On balance, it appears that non-tariff barriers may be the most problematic for firms wishing to trade with the EU following a hard Brexit in particular. However, tariff barriers (and related international competition) are not insignificant, and are especially worrisome for the Food and drink sector. There are some concerns around labour availability, but these are very sector and firm specific and firms appear hopeful that any impact can be addressed during Brexit negotiation.

8.5 Recommendations

The uncertain nature of Brexit makes the formation of policy/research recommendations and key issues to be considered by Welsh Government an invidious task. Following however are a number of principles/issues which might guide emergent regional policy as Brexit unfolds;

In most cases, focus on business themes, not sector

Despite the above focus on key sectors as a lens with which to examine Brexit, the heterogeneity of responses of firms within sectors – dependent on ownership, product and existing markets for example, suggest that a sector approach might not be an appropriate structure through which to target the policy response. Rather consideration needs to be given to firm characteristics as the response lens rather than the 'sector', however defined. Indeed, in targeting the response in Wales, it might then be more useful to discount the sector tag, but to look far more closely at themes which unify groups of firms in terms of ownership, product cycle, and firm target markets, as opposed to any bundling of response by sector. Indeed, the analysis in this report would suggest that the largest firms in Wales (represented in part by the Anchors and RICs) can likely be clustered into groups on these types of business themes more easily than they can be grouped in terms of a simple industry classification. For some areas of regional support to large and medium sized businesses it might also be useful to adopt the risk framework described in Sections 2.2 and 7 of this report.

..although a holistic lens is sometimes required

Contrary to the above, in at least one case the sector under consideration is considered to be too *narrow*. It is probable that the competitiveness of the food and drink sector post-Brexit will be tied more closely to the nature and scale of the agricultural sector in Wales and the UK. Here, the historic split of policy between agriculture/land use and food processing (partially a result of EU funding structures) may be unhelpful, and a more holistic approach beneficial, particularly in terms of policy development and sectoral initiatives.

A focus on Anchors and RICs?

There has been a great deal of debate in Wales over the selection of key sectors for special attention by Welsh Government, and this has dovetailed into the development of sector teams. The identification of the Anchors and RICs has evolved out of this. The analysis of firm level data on trade, local functions and vulnerability to tariff and non-tariff barriers in a post Brexit world might be seen to question how many of the current Anchor companies actually fulfil an anchor role in the economy. This is a sensitive issue and Welsh Government would not wish to remove firms from either the Anchor or RICs listing. However, it is recommended that there is some re-evaluation of the criteria used to select future Anchor companies.

Sectors missing from the analysis

In this analysis it is accepted that the consultations were undertaken with a sample of firms that are representative of some of Wales' most important sectors. However, in some, the categorization used in this report is broad, but with this focus also linked to a need in the region to consider key developmental themes rather than sector. Notwithstanding there are some sectors which are either not covered, or would benefit from further analysis. For example, the report does not deal explicitly with Tourism facing sectors, and there is limited attention to parts of the business and professional services sectors in Wales. The report also does not analyse the higher education sector, which is one of Wales' large export earners.

There are also dangers in focusing on large and medium sized firms. As has been explained in the earlier sections of the report, some of these firms are in real danger of downsizing irrespective of any Brexit pressures. Then there is an argument for also focusing attention on those firms that are growing fast in Wales, or are in relatively faster growing market segments. These firms may face different pressures during EU transition processes.

The big exporters?

The review also suggests care in over-focusing any Welsh Government responses on large and medium sized firms that appear to be large exporters. In assessing embeddedness it is important to consider the value added *in Wales* by overseas exports, realising that in some of the largest exporting sectors little value is added within Wales. This is not to downplay the importance of the largest exporters, which typically offer relatively high pay, and in selected cases relatively high productivity. However, in responses it must not be forgotten that in selected services (particularly business services, ICT) the value added in their exports might be relatively high. Future analysis might explore which of Wales' services sectors feature higher levels of value added in their exports.

The scenarios

A theme running through our report has been uncertainty. Indeed at the start of the research process (May 2017) for this report the 'mood' was around a hard Brexit. As these recommendations are being made (during July 2017) this is in the context of a minority UK Government being strongly challenged on its programme for transition. The consultations were more focused on gaining business thoughts on the consequences of a hard Brexit. Continued uncertainty matched with political reality in Westminster would suggest that the probability of 'softer Brexit' is now more likely. Future work might focus on specific considerations for firms under subtlety different Brexit scenarios, notwithstanding that many of the risk factors discussed in this report result from current uncertainty as much as expected differences in the final UK settlement. Moreover, the consequences under difference Brexit scenarios have been very well covered by previous analysis by organisations such as the CBI.

Data improvements and research

While the situation with respect to economic data on Wales has improved there is still almost no data on how Wales trades with the rest of the UK, and through other regions, and then with the rest of the world. The same is true of how Welsh firms use imports from various geographical sources. Developing datasets on intra UK trade might be resource intense, but in understanding how external shocks might affect the Welsh economy such information is important.

A better understanding of trade will also help inform Welsh Government decisions on other matters, including tax variation and global responsibility under the Wellbeing of Future Generations (Wales) Act.

Alongside data improvements Welsh Government will need to keep abreast of emerging research findings on how Brexit processes are affecting labour and product markets, and with the Economic and Social Research Council in particular having financed a large number of research projects during 2016-17 with expected findings that will be very relevant to the UK regions.

In terms of broadening the study and future research priorities it is important again to stress sectors absent from the analysis here, particularly tourism and agriculture, and the focus on large and medium sized firms. Inevitably a hard Brexit would impact on areas of Wales very differently. Firms in sectors that might be hardest hit are often adjacent to areas facing persistent socio-economic problems. Many of the large and medium sized enterprises consulted for this report are also outside of rural areas. The different socio-economic effects expected in different geographies (urban, rural) in Wales will be an important area of future work, not least how changes might work to widen disparities within the Welsh economy in terms of access to opportunity.

Non-tariff barriers

This study has been undertaken over a relatively short period and has focused on one EU transition scenario. It appears from both the consultations and review is that it is non-tariff barriers which are potentially more uncertain and hence of more concern for selected of the firms consulted in this study. It is in assisting firms to respond and understand the scale of the challenge with respect to non-tariff barriers that Welsh Government could make an advantageous intervention. A recommendation following from this report would be a more thorough review of the non-tariff barriers that will face Welsh businesses and then, following a consultation with large and medium sized firms, the development of targeted information to assist firms appreciate the scale of the challenge, and possible responses. The scale of the challenges here should not be underestimated.

Inward investment marketing

Whether the EU transition process ends with a 'hard' Brexit or not, the material in this report would lead to the conclusion that Welsh Government will need to look carefully at the spatial distribution of location marketing resources. PPIW (2014)[16] examined the location of overseas offices of Welsh Government, and criteria that might be applied in deciding on their future location. Key among criteria noted in the report related to:

- Existing value/growth of inward investment flows from the foreign country to EU/UK/Wales in last five years
- Existing value/growth of inward investment flows from the region/city to UK/Wales in last five years
- Existing stock of inward investment in UK/Wales from the foreign country

[16] PPIW Report No. 7 July 2014. *Location and Staffing of the Welsh Government's Overseas Offices*, Cardiff, PPIW

- Existing trade relations between UK and the foreign country/region
- Economic growth rate of the home state and region

Decisions based on these criteria might have been different pre-Brexit vote. Indeed the EU transition process is already impacting flows of inward investment to Wales, and trade relations will change. Then in planning future overseas representation Welsh Government must consider how Brexit will affect these variables and build these into future overseas marketing decisions. In this respect it is worth noting that much of the inward investment 'boom' that occurred in Wales during the 1980s and 1990s was driven by access to the EU market. It is some of the large inward investors that came to Wales during that period, particularly those which are focused almost wholly on production which now look particularly vulnerable. This is particularly the case in operations where there are similar production plants within the multinational group elsewhere in the EU, where plants are engaged in contract manufacturing, or where product life cycles are mature and new investment is required at Welsh plants in the short term to continue operations.

Opportunities

The consultation process revealed few firms identifying any positive opportunities deriving from the Brexit process. One recurring theme was in relation to public procurement and how far in a post-Brexit world there might be opportunities to use public procurement more to encourage local firms. Within Welsh Government there is already interest in how public procurement strategy can be designed to better link with regional economic development processes.

More generally for policymakers leveraging tacit knowledge from selected large and medium sized firms will be critical. Among the firms consulted for this report some had much wider experience of working in markets outside of the EU, and in developing markets. Firms might be persuaded to share experience with non-rival firms and networks in Wales. Similar approaches have been developed by Welsh Government in terms of encouraging productivity spillovers through new manufacturing and operational techniques.

Other issues for response

In forming policy responses the research in this report also leads to some further points:

- Any labour market interventions must be narrowly targeted. The consultations showed that labour market issues were specific to a few sectors, rather than more widespread through those firms which were consulted in this report.
- Earlier in this section it was suggested that the focus needs to be on the firm not the sector. One further useful step is to consider the role of individuals within firms. In terms of influencing parent firm investment decisions, attention needs to be given to how local directors can be assisted by Welsh Government and local institutions in making the case for local production.

Representations to UK Government

One context for this report was issues that Welsh Government should highlight in representations to UK Government as the process of EU transition develops. The evidence presented in this report reveals that parts of the Welsh economy are at risk from a hard Brexit. In Welsh manufacturing there are large numbers of branch plants.

While inward investment has been important in transforming economic prospects in some parts of Wales, some elements of the inward investment base are now vulnerable. At the very least EU transition has made these facilities more vulnerable. Then a critical point is Wales' strong reliance on inward investment, and then making the point that a reduction in the existing stock, and reduced inward flows would have marked regional economic effects. Indeed a sustained reduction in inward investment flows would probably work to widen the economic disparity between Wales and the UK in term of indicators such as gross value added per head. Then while resources are focused on trade and exit negotiations additional resources at UK level need to be placed into the location marketing effort, and showing that the regions are very much open to business.

Appendix 1: Anchors and RICs Listing (Note: consultations were also undertaken with firms which were not Anchors/RICs)

Anchors	Sector aggregation	RICs	Sector Aggregation
Admiral Group Plc	Insurance	ALControl UK Ltd	Business services
Airbus Operations Ltd	Aerospace systems and services	Alun Griffiths (Contractors) Ltd	Construction and civil engineering
Airbus Defence and Space UK	Information and communications technology	BSW Timber Group	Paper, wood, wood products
Biomet UK Ltd	Medical/health products and services	BTG Protherics UK Ltd	Medical/health products services
Boom Cymru TV Ltd	TV production and creative	Calsonic Kansei Europe PLC	Automotive, transportation and related
Boparan Holdings Ltd	Food and drink	CastAlum Ltd	Automotive, transportation and related
British Airways Engineering South Wales	Aerospace systems and services	Castell Howell Foods Ltd	Food and drink
British Telecommunications (BT) Plc	Information and communications technology	Clifford Jones Timber Group	Paper, wood, wood products
Celsa Manufacturing (UK) Ltd	Steel	Compact Orbital Gears Ltd	Other advanced manufacturing and engineering
Centrica	Energy & utilities	Convatec Ltd	Medical/health products services
CGI	Information and communications technology	Cuddy Group	Construction and civil enginnering
Control Techniques Drives Ltd	Electrical engineering, electronic components, sem	Cwmni Da	TV production and creative
Dawnus Group	Construction and civil engineering	Dawn Meats (UK) Ltd	Food and drink
Deloitte	Business services	Dow Corning Ltd	Process and chemicals
Dŵr Cymru Welsh Water	Energy and utilities	Dunbia (Wales)	Food and drink
Ford Motor Company Ltd	Automotive, transportation and related	Eastman	Process and chemicals
GE Aircraft Engine Services Ltd	Aerospace systems and services	Finsbury Food Group Plc	Food and drink
GE Healthcare	Medical/health products and services	First Milk and Cheese Company Ltd	Food and drink
General Dynamics UK	Information and communications technology	Freudenberg Oil and Gas Technologies Ltd	Other advanced manufacturing and engineering
Harris Pye Engineering	Other advanced manufacturing and engineering	Glanbia Cheese Ltd	Food and drink
HSBC Holdings Plc	Financial services	Ifor Williams Trailers	Automotive, transportation and related
IR Newport Ltd	Electrical engineering, electronic components, sem	Invertek Drives	Electrical engineering, electronic components, sem
IQE Plc	Electrical engineering, electronic components, sem	Jones Bros Ruthin (Civil Engineering) Co Ltd	Construction and civil enginnering
JCB	Automotive, transportation and related	Kellogg Company of Great Britain Ltd	Food and drink
Legal & General Assurance Society Ltd	Insurance	Kimberly Clark	Paper, wood, wood products
Lloyds Banking Group	Financial services	Kingspan	Other advanced manufacturing and engineering
Meritor Heavy Vehicle Braking Systems	Automotive, transportation and related	Knauf Insulation Ltd	Other advanced manufacturing and engineering
Moneysupermarket.com Group Plc	Financial services	Kronospan	Paper, wood, wood products
Norgine Ltd	Medical/health products and services	Laura Ashley Plc	Textiles, clothing and marketing
Nuaire Ltd	Other advanced manufacturing and engineering	Magellan Aerospace	Aerospace systems and services
Ortho Clinical Diagnostics (OCD)	Medical/health products and services	Magnox Plc	Other advanced manufacturing and engineering
PCI Pharma Services	Medical/health products and services	Mainetti Group	Other advanced manufacturing and engineering
Pinewood Studios Wales	TV production and creative	Marshalls Aviation Services	Aerospace systems and services
Principality Building Society Ltd	Financial services	Nice-Pak International Ltd	Medical/health products services
Qioptiq Ltd	Other advnaced manufacturing and engineering	Northern Automotive Systems Ltd	Automotive, transportation and related
Redrow Plc	Construction and civil engineering	Orangebox	Other advanced manufacturing and engineering
RBS	Financial services	Panasonic Manufacturing UK Ltd	Electrical engineering, electronic components, sem
Royal Bank of Scotland	Financial services	PHS Group Ltd	Business services
RWE	Energy & utilities	Puffin Produce Ltd	Food and drink
SSE Plc	Energy & utilities	Rachel's Dairy Ltd	Food and drink
Sharp Manufacturing Company	Other advanced manufacturing and engineering	Randall Parker Foods Ltd	Food and drink
Siemens Healthcare Diagnostics Products Ltd	Medical/health products and services	Raytheon	Aerospace systems and services
SIMEC/Liberty House	Steel	Rondo Media	TV production and creative
Sony UK Technology Centre	Electrical engineering, electronic components, sem	RPC Promens	Other advanced manufacturing and engineering
SPTS Technologies Ltd	Other advanced manufacturing and engineering	S.A. Brain & Company Ltd	Food and drink
Tata Steel Europe	Steel	Schaeffler (UK) Ltd	Automotive, transportation and related
Tinopolis Plc	TV production and creative	Seda UK Ltd	Other advanced manufacturing and engineering
Toyota Motor Manufacturing (UK) Ltd	Automotive, transportation and related	Sogefi Filtration Ltd	Automotive/transportation
UPM-Kymmene (UK) Ltd	Paper, wood, wood products	Solvay	Process and chemicals
UPM Shotton	Paper, wood, wood products	Sorenson Media	Information and communications technology
Valero	Process and chemicals	South Caernarfon Creameries Ltd	Food and drink
Wales and West Utilities Ltd	Energy & utilities	Target Group Ltd	Information and communications technology
Western Power Distribution (South Wales) Plc	Energy & utilities	Tillery Valley Foods Ltd	Food and drink
Zodiac Seats (UK) Ltd	Aerospace systems and services	Triumph Actuations Systems – UK and IOM	Aerospace systems and services
		Volac	Food and drink
		Walters UK Ltd	Construction and civil enginnering
		Watkin Jones Group	Construction and civil enginnering
		WRW Construction Ltd	Construction and civil enginnering
		Wynnstay Group Plc	Food and drink

Appendix 2 Consultation Schedules: EU Transition – Large and Medium Sized Firms

April 13th 2017

Introduction

Schedules of indicative questions for anchor companies and RICs to inform Welsh Government understanding of business concerns and present and future actions during the EU transition period. Findings from the consultations will also assist Welsh Government in its response and discussions with the UK Government surrounding the EU Transition negotiations.

The consultation themes are designed to:

- Examine how Brexit options (particularly a potential WTO model) will affect Welsh businesses directly and indirectly.
- Identify sectoral winners and losers (and vulnerable sectors), as well as any opportunities for businesses in Wales.
- Identify the value of import/export trade within key sectors in Wales.
- Show how far Wales might be impacted differently from the rest of the UK and any regional issues within Wales.
- Consider relevant supply chain impacts (indirect effects in the regional economy).
- During the consultations it would be useful to cover trade-related themes but hard data on trade (imports and export behaviour) will be collected by a separate survey tool that should be left with the firms.

Note: In the consultation process there will be a tendency for consultees to focus on 'problems' post Brexit, whereas Welsh Government needs to understand issues of their preparedness, planning, strategic options and time-frames. There could be a real problem that some businesses will have been unable to grasp the differences between commonly developed exit scenarios (customs union, WTO, EFTA etc).

Outline Consultation Schedule

A: Business basics

Could you provide a brief description of your site products and services (probe for maturity of products and services produced in Wales, and short and long run prospects for new products and services)?

- What is the ownership structure of the site (foreign-owned, subsidiary of UK firm, independent etc); from where is the Welsh site controlled – where are decisions on products/services made in Wales taken?
- Where applicable are there other group sites/subsidiaries in Europe (EU-27) producing similar goods and services to those in Wales?
- Could you summarise recent (last three years) trends in employment (and/or output) at the plant, and any major changes that have occurred over this period?
- Could you tell us how your operations might be affected by any changes in regulations around the freedom of movement of labour, and in particular how this might affect the supply of skills to your operations, and future demand for skills? How many foreign (rest of EU) national do you employ?

B: Trade and linkages

- Could you briefly review the main markets for your goods and services (probe for extent to which products go on to other group companies, and extent to which to RUK, EU, Rest of World markets; probe for extent to which products are sold to RUK or other Welsh firms who subsequently export to EU states?
- Could you briefly review the main purchases of the site? (probe for largest purchases and extent to which from other group companies (where applicable) and whether from Wales, RUK, EU or ROW.
- Could you briefly comment on how far there is export trade with states with whom the EU has trade agreements?
- Could you briefly comment on other non-trade linkages/alliances held with EU partners/institutions, and membership EU-led consortia (i.e. selected defence/ICT firms)

C: Preparedness and planning (probe for extent of plans and knowledge of process)

- Could you outline any subsidiary/group plans to treat with Brexit issues; i.e options analyses, current activity on developing alternative markets?
- What types of assumptions are being taken within your firm/subsidiary on post Brexit conditions? (i.e. is firm assuming a movement towards WTO rules on trade)
- Can you comment on your knowledge of the level of tariffs facing your products were the UK to come out of the Single Market and operate under WTO rules?
- In the case of your firm/subsidiary what is your knowledge of regulations around rules of origin and the definition of an EU made product?
- How far could your existing trade within the EU be impacted by different non-tariff barriers following Brexit (probe for regulatory standards adhered to; does firm source goods internationally; rules of origin, certification and testing)
- Can you comment on the main non-tariff barriers facing your products were they no longer produced within the EU at all?

D: Consultee views on key EU-transition issues/opportunities

- From the perspective of your firm Welsh operations what concerns are uppermost in the period until and post Brexit – probe for and try and seek extent of concern in following (also probe for examples, where possible)

	Critical for this business in Wales	Of some importance for this business in Wales	Uncertain/not sure/need more info	No concern at all for this business
Uncertainty of further group investment in Wales during the UK-EU negotiation period				
Loss of trade in EU countries from this site pre-Brexit				
Loss of trade post Brexit due to direct tariffs on our goods				
Loss of trade post Brexit due to non-tariff barriers such as rules of origin/standards				
Loss of personnel from this site/problems of gaining access to staff				
Loss of trade due to issues of EU public procurement				
Loss of trade post Brexit due to increased competition from ROW imports				
Loss of activity due to lower levels of collaboration with EU firms and institutions				

- From the perspective of this firm what are the main opportunities that will arise from the EU transition period?

	Critical for this business in Wales	Of some importance for this business in Wales	Uncertain/not sure
• Opportunities in new markets outside of the EU			
• Access to cheaper goods and services from the ROW			
• Less business regulation			

E: Consultee views of role of WG

- Is your firm/group in Wales making representations about Brexit and to whom? (probe for whether firm is acting individually or through trade organisations etc)
- How can WG best play a role in providing intelligence and information for your firm?
- How might WG focus its efforts in representing Welsh business interests around EU transition to UK government?

Appendix 3 Commodity Codes, Welsh Exports and WTO Tariff Rates

SITC Code		2013	2014	2015	2016	HS code	Tariff range	Notes
00	Live Animals Other Than Animals Of Division 03	1.4	2	2.8	4.9	01, 05	0.1-1.2	
01	Meat and Meat Preparations	58.9	55.8	55.2	73.1	02,16	5.1 - 18.2	HS 16 includes preparations of meat which attract much higher tariffs
02	Dairy Products and Birds' Eggs	43.8	44.1	34.4	46.3	04,	5.3	This HS code includes dairy (zero tariff), eggs (7.7 % tariff) and natural honey (17.3% tariff)
03	Fish, Crustaceans, Molluscs and Aquatic Inverterbrates and Preparations Thereof	24.5	26.3	22.8	25	03, 16	11.1-18.2	HS 16 includes preparations of fish which attract much higher tariffs
04	Cereals and Cereal Preparations	56.4	48.8	51.6	46.6	10, 11, 19	2.2 - 12.2	The lower tariffs are for cereals, and the higher end is for prepared products.
05	Vegetables and Fruit	11.3	7.9	6	8	07, 08, 12, 13, 14, 20.	1.2-17.5	The higher tariffs are for prepared fruit/veg products.
06	Sugar, Sugar Preparations and Honey	3.1	2.9	3.7	3.1	17, 18	6.1 - 8.8	
07	Coffee, Tea, Cocoa, Spices and Manufactures Thereof	7.6	9.2	11.9	12.3	09,	2.3	
08	Feeding Stuff For Animals (not Including Unmilled Cereals)	14.5	10.8	11.7	12	23	8	
09	Miscellaneous Edible Products and Preparations	31.5	28.9	34.2	51.4	15, 21	5.4 - 9.2	
0	**Food and Live Animals**	**252.9**	**236.7**	**234.3**	**282.7**			
11	Beverages	80.3	60	61.8	71.6	22	3.9	
12	Tobacco and Tobacco Manufactures	0	0.2	0	0			
1	**Beverages and Tobacco**	**80.4**	**60.1**	**61.8**	**71.6**			
2	**Crude Materials, Inedible, excl. Fuels**	**253.7**	**295.7**	**228.7**	**240**	44, 45, 47	0 - 2.7	This HS code includes natural products and prepared/processed products. Natural/simply prepared wood/cork has zero tariff.
3	**Minerals, Fuels, Lubricants etc.**	**2847**	**2073.6**	**1535.1**	**1494.1**	27	0.8	
4	**Animal and Vegetable Oils etc.**	**10.1**	**9.3**	**9.8**	**9.2**			
5	**Chemicals and Related Products**	**1335.7**	**1358.4**	**1353.9**	**1471.5**	28-35, 38-39	0 – 6	Pharmaceutical products = zero, plastics = 6%, organic/inorganic chemicals average = 4.4%
61	Leather, Leather Manufactures not	1.1	1.4	1.3	1.1	41-43	2 - 4.6	

	Elsewhere Specified and Dressed Furskins							
62	Rubber Manufactures not Elsewhere Specified	102.6	107	102.3	119.4	40	2.6	
63	Cork and Wood Manufactures (Excluding Furniture)	15.8	14.5	8.6	7.7	44, 45	2.7 - 2.2	
64	Paper, Paperboard and Manufactures Thereof	173.2	180.8	169.6	180.9	47 - 49	0	
65	Textile Yarn, Fabrics, Made Up Articles etc.	55	43.8	39.6	46.7	50 - 63, 65	2.8 - 10.2	
66	Non-Metallic Mineral Manufactures not Elsewhere Specified	130.6	169.2	168.8	157.7	25, 68 - 70	0.2 – 5	
67	Iron and Steel	1027.9	973.9	779.8	435.3	72, 73	0.3 - 1.7	HS 72 is iron and steel = 0.3, HS 73 is articles of iron and steel = 1.7%
68	Non-Ferrous Metals	442.4	701	668.3	664.2	74 - 76, 78 - 81	0 - 6.4	HS 76 = Aluminium = 6.4%
69	Manufactures Of Metal not Elsewhere Specified	244.2	262.1	246.9	272.6	82, 83	2.5 - 3.1	
6	**Manufactured Goods**	**2192.8**	**2453.7**	**2185.2**	**1885.5**			
71	Power Generating Machinery and Equipment	306.5	229.9	206.6	222.7	84	1.8	
72	Machinery Specialized For Particular Industries	197.4	200	211.5	238.2	84	1.8	
73	Metalworking Machinery	55.8	49.2	47	53.4	84	1.8	
74	General Industrial Machinery and Equipment and Machine Parts not Elsewhere Specified	289.9	304.1	264.6	246	84	1.8	
75	Office Machines and ADP Machines	157	174.4	171.6	193.4	84	1.8	
76	Telecomms and Sound Recording and Reproducing Apparatus and Equipment	108.2	109.9	111.7	115.4	85	2.8	
77	Electric Machinery, Apparatus and Appliances and Electric Parts Thereof not Elsewhere Specified	694.8	608.6	522.2	571.6	85	2.8	
78	Road Vehicles (Including Air Cushion Vehicles)	453.5	408.2	435.6	544.6	87	5.8	The more detailed HS codes relating to car parts/accessories - tariff range is 3.7- 4%
79	Other Transport Equipment	2044.4	2057.4	2818.1	3467.3	86 - 89	1.1 - 3.3	HS 88 is aircraft, spacecraft and parts = 3.3%
7	**Machinery and Transport Equipment**	**4307.5**	**4141.7**	**4788.9**	**5652.5**			
81	Prefabricated Buildings; Sanitation , Plumbing, Heating and Lighting	28.2	30.9	24.4	21.8			

	Fixtures							
82	Furniture and Parts Thereof; Bedding and Mattresses etc.	264	307.6	277.2	298.9	94	2.3	
83	Travel Goods, Handbags and Similar Containers	7.1	7.8	8.5	10.4			
84	Articles Of Apparel and Clothing Accessories	75.3	87.1	89.6	99.5	61, 62	11.3 - 11.7	
85	Footwear	19.8	22.5	24.8	25.9	64	11.1	
87	Professional, Scientific and Controlling Ins and Apparatus not Elsewhere Specified	293.9	289.9	281.7	301	90	2.2	
88	Photographic and Optical Goods not Elsewhere Specified; Watches and Clocks	63	53.1	51.9	59.5	37, 91	4.2, 5.5	
89	Miscellaneous Manufactured Articles not Elsewhere Specified	324.2	373.7	374.8	394.8	92, 93, 95 - 97	0 - 3.3	
8	**Miscellaneous Manufactured Goods**	**1075.4**	**1172.7**	**1132.9**	**1211.8**			
9	**Commodities not Classified Elsewhere**	**43**	**41.2**	**81.5**	**85.7**			
	Total	12398.4	11843.2	11612.2	12404.7			